#7C

SEQUENCE LISTING

<110> Abe, Yuki
Ono, Chiho
Yoshikawa, Hiroji

<120> Genes from a Gene Cluster

C₁

<130> 01149/HG

<140> US 09/836,705
<141> 2001-04-17

<150> JP 2000-116591
<151> 2000-04-18

<150> JP 2000-117458
<151> 2000-04-19

<160> 62

<170> PatentIn version 3.0

<210> 1
<211> 34203
<212> DNA
<213> Penicillium citrinum

<400> 1
gatcaatact acgtcgttgt tatttccttg tcagtaatga ctaacaaatt ccccagaaca   60

gacgaagtca cagctcacac cacaagagaa aatgagtcca gcgaggatta cagatttctc   120

gccaggcaaa ccgagaaaag ctctcttatg catccacggt gccgggtgct cagcagccat   180

attccgcgtc cagatctcta aactgcgcgt ggcgttgaaa aacgagtttg aattcgtata   240

```
tgcgaccgcg ccgtttagct ccagccccgg acccggcgtg cttcctgtct tccaaggcat      300

gggtccatac tacacctggt tccaaaagca tcatgacgcc gttacaaaca cgacaacccc      360

cacggtgggc gatagagtag cggctgtgat cgggcctgtg caaaagaccg tccaagattg      420

gtctataact aacccacagg cacccattgt cggcatagtg gccttctctg agggcgcatt      480

ggtcgccact ttgctgctcc atcaacagca aatgggaaaa ctgccatggt ttccgaaaat      540

gagcattgct gttttgattt gctgtttcta tagcgatgaa gccagagatt acatgagagc      600

cgaggcgcaa gacgacgacg acaagctaat aatcaacgtg ccgacactgc atcttcacgg      660

tcgtcaagat tttgctctcc aagggtcgag acagatggtt gaaacacatt acctgcctca      720

gaatgcagat gtactcgagt ttcagggaaa gcataatttt cccaacagac cgagtgatgt      780

ccaggagacg gtcaagcgct tccaacagct atatcaaaag gtcaagatgt caggttcatt      840

tgtctaggtg agacaacagg gtatatagca aggctctggc tctcatgcct agtccatacc      900

acattttac tgaacaaatt tgaatagttc taatcttaca cggtttgaat gctcaccttc       960

caagggtgat ttagttatag tggtcgcgac catctcataa atatttcgtg aacatatttt     1020

ggatagatca tggaaggctc gttctgaaca ggcatgacag acatctaaaa ccactcgatc     1080

accacaacaa ggcactaaac cagtaactat ggaactattt gcaatggcgt cgaatttata     1140

tacaggatgg attgaaatca attccaagcc ttggaggttt caccttcctc acagagtctt     1200

tcgaaacgcg ctaccgaggt atatttatca ccgttacggt actctgaacc gcgctatcta     1260

acttgatgtt acgattgctg caataaagaa gagcaacgaa ggtagaagta attttgacaa     1320
```

agatacaaga cgaattcgct atttgtagat gaatatgcgt gtgtcaattg acgccgaatt   1380

caggatagat ttgccatctg ctctattgcc aatttctaat ccatctttat catgaacaac   1440

actcaaacca cacatctgaa ttcacggcgc tgaacgatct aggccaactt cagagccggg   1500

ttcatcgaga acatagtgag gattgaagaa aagtggtcta caaaggcctg agcgtgctca   1560

gggccataca gcgagctctg aagtttgaca tgaatgagtg ggtccttggt agggtcatcc   1620

cacatctcga gaacgatgtc ataaggagtg cgctcacggg aagcgagaac actcgtcatt   1680

ttggcattgc caattgagcc actctccgct tgaccctgct tgtaatcaaa gacagcctgg   1740

aacaaggggg cgtgtgtctg agtcttgggt tcctcgcctg aggtagggag attcaggcct   1800

agacagtcga ggatgacgcc atacggcacc cgcgcgtgtt gcatggcctc acgcacactg   1860

tccttggtgg ctacaaggtg ctcgccgaat gtcttgctgc cgacgaactc atcaaagcgc   1920

aggggaagca cgttagcgaa aaagcccatc gccgaaattt cttccatggt ggatcggttg   1980

gtttcggcga ggccgatggt tatgtctttg ctgccggtaa gacgcgccaa caaaacgtgg   2040

taggcggcca ggtagaactg catggggggtt gccttgtgct tgcggctccg ctctttgatt   2100

cggaaggcga ccatgggatc taaacgagca attgcttcat actgctgcca cgtgaatggc   2160

tgtatttgct gctgctctga attggcagca gggtcattga tcagattcat gatgggaagc   2220

acggttggcg cagatgacga gactttgcta tgcatggact tccagaacgc gatatcgtcc   2280

cccattcgcc cattttccag gtttttcccgc tgttggacgg ctagatcaga gaattgggtc   2340

gatggtcgct gcattttcac cccgctgtaa atctgcccga tctcattgaa caggttttct   2400

```
gttgttgagc catcaccaac taatctgtgg tagccgatta ccaacaggtg gtcatctgtg    2460

ccccagtaga aatcaacgag tctgagagtg tcacctgtgg agatgctata gtttgtcttc    2520

tcgagtttcc ggtactcttc ctctgcctcc gcagcgttgt tcacctgaac aaagtgcact    2580

ctgttctccg ggttcttgag aaccacttgg acgggaccat ttaaatcgct gctatagtca    2640

tcgccagtaa caaagcacgt acggaagatc tcgtgacggc gcaatgaggc tttcagagcc    2700

cgcctcaacc ggtcgaggtc aatggtaccc ttcatgaaca tgccaatagt gttgttgaag    2760

atggtatgat cttttaccat ttgttgctgc ctccaggaat actcctggcc aagggacaac    2820

ctctcgcgac gaagaatctt acggcctccc tgctcattat cgtcctcttg ctcttcatcc    2880

tcttcggctg acgacgcatc tgtgctggta gcagagcttg cttcatcatg gctgtctgtt    2940

ggtgtcggag aagccccgct gtccgaggtt cccgtggaat caccaatttg caacagcagc    3000

ggaatggatg tagctgggag tcgggtggcc gcgtcgtcgg caagatcagc gacagaagca    3060

ccgccaagta ccctcaagag tgggaggtca aggtagagtt gctttgagaa ccatgagccg    3120

acagtcactg cacccaagga gtcgacacct tgatcaatga gaggaatggt tgggtccacg    3180

ctctccccgt ccgaaacttg gagggtaaca cggagtttct cagatagacc atctgcaact    3240

ttgttagttt gaactcgata tcaggaaacg catgagagat aacttaccaa tcacgatttg    3300

ccgaacttgg tctaaagttg ttgcttgttt gagctggtcg gcaatggagc ctttagaccc    3360

tgatccattg tcgccaccgt ctccgcgttg accgggaatt ttgaagtttc cgaaacgagg    3420

gtcgttgaag taaataattc gatcttgaag cgcagggtca agatctggga tacccgtggt    3480
```

```
aagctcaagg tccgccatgt caatgaccgt cttgcgctgt ggttgctgcc gggcacgctg    3540

gtcagacacg accgcttcgg cgaaaagcgt gtgcagctca tgctcttcaa ctgagtcaaa    3600

catgaaacgg atagcatcaa agtcctcctc catctcggcc ctcgtgacaa accctacacc    3660

gtaaacggca ccaatatcga tggttgatcc ctgtggttgt gcgttagtaa cttgacgtcg    3720

atgcatgata attcaggggt agaaaatacc gccaatcctc tggcgcaccg ttgctgggcc    3780

agagcctgta ggtaggcatt cgcagcgcca tagttggact ggccaggatt gccaataact    3840

gcaacaatgg acgaaaacat gatgaagaag tcgagcgcct tgctgcccgt ctgttcggag    3900

aaccgttcat gaagaatgcg tgctccttgt accttgggct tcaacaccat gtccatcatc    3960

tggtggtcca tgttcttcag catgacatcc tgcagcacca aaggcccgaa cgcgatgccg    4020

gcaacaggtg gcaacttcat atcgacaagc ttgccaaggc cagcatcgac tgaatcctca    4080

ttggcaacat ccctaaagaa agtaattgga taagtaaacg aggatgtggt agcaaggtgt    4140

gatgtgatat caatcaactt acattgacag aacggtgatg tcaccaccaa gtgcctccat    4200

gttggcgatc catttgggat caagtcgagg gttccggcta gtgagcacaa catggcgggc    4260

gccatgcaag atcatccagc gacagagaga gcgaccaagg tccccggtaa gaccaacaag    4320

caaatacgtc ttcttgttgg aaaataagtt accagagtcg atggggcaaa tcctagcgga    4380

cacctcattt tccttccagt cgatgacggt ggccagattg aagcgttggt cattgtggtt    4440

gacagagagc tgaccaggca agagaatttg tgtggctgta ataactttct cagtgtcgtc    4500

gacagtcgac gcagagacgg tattttttgc cattgccaca gagtgctcga ggattggaat    4560
```

```
atcctcaaca tgactaactt tgtatgtgga agctgtactt cggataagat agtcaccact    4620

gtacatgaag caactgggtg gtagcaactt ggccaaacgg ttggttatcc cggcagcagt    4680

ccggtcggta gacaagtcaa agaatgccat catgtttgtc ggcaggctgt gtttcagccg    4740

agcgtcggtt tccttggcat gtaatcggat ccaaggagcc ggaatagttt tgacgtcgga    4800

cagagttgtt gccaaatgaa cctgaacacc gtaggttttg gccgactcca gaattgcttt    4860

gacgcagaag attgggggct ccataatcag aattgatgca tcagagccaa aggactgagc    4920

gctagagaga attgtttcgg caaggagggc tgcagctgtg gacaacaaga aggaactatc    4980

ctcgccttcc gccatgttat cgggcagact atgcatgtag tttctcggta catgcagtat    5040

agatccattc ttctcagcca gggcgactac aggcacctca catgtattct ccagaatact    5100

gccctgcacg acatggaagt atccgagatg gcccacgcga attgcctggg gaagagcgta    5160

gcgaacacga acagttgctt ttccagcatg acgagcgtct tctaacgaat cacacgtctc    5220

ggttgactca agatagtaca tcgatgagga tgctcccctc gcctctttca gtgcaatggc    5280

cgtcttggac gaattaaagt taccgaaaat tggacgacga gacgagttca tacggtcgtt    5340

cctagcaata tcctgcttca aacgagggac ccaggcacga cccttgcacc agtacacttc    5400

gggctcatga gtccatgtta ttgattccaa aagctgatca tcgctctcct cgaagcgcaa    5460

aagttgctca acgaagaatt tggtgtctag gttctccaca gtatcgacat cgaagacgtg    5520

cgttcccaag tcagggttct cgagcttgat tgtcctcaac attccgatgg tgctggcctg    5580

gtggggatga tcaatccagg cattctctgt cagccacatc atgcgtccgg cgtagaagag    5640
```

```
aagagacttg actgcctcaa acttgtcctc .tcaaggttg caaaacactt catcatcaag    5700

ttccgagagg atgacaaaag tcgacttagg ctgcaaggcc gggtcgtcga gaacactttc    5760

cagccgcttg acggagtgga tgtgtctatg cggtagggca gctttcatgt cgttcaaaat    5820

gcgttcggtt tttgtcgatt cgccaccgat aaccactaat ggcgggtatg agtccttcaa    5880

tggagcagaa agtggatcat acaaacgctc aacggtggca tccacagcat gtgtactgaa    5940

gacagacggg atcaaatcat cctctcgatc aagtgtccga ctatcgacgc cagagaaccc    6000

aactctcttg agggtatgct cccattggtc aacggacccc gaggcactca aagcacgagt    6060

ttcgtcttct ccagtccatc gatcagcgaa aagcccagag atgaaggcga ggcgagcagg    6120

ctcgcgatgg gtgaccccga aagtaaccaa gtgaccaccc ggcttgagca aggaccttat    6180

gtgagccaat ttttcctcga agttggagct ggcatggagg acatcggatg caataatcag    6240

atcgtaggag tgaggcttga atccttgctc tgctgggctt ctgttgatgt ctagtgcctc    6300

aaactgcatg agaccgtcga attcggaaag ttgttcacgg gccttgccaa taacatccgc    6360

cgagatgtca gtgcaagtgt aactgttgaa accaagttga ggtgatgcaa gaacgcgctt    6420

cgtggcgatg cctgtaccca agcctaaaaa gcgaacgaca gattagcaaa ctgcctagtt    6480

acttacattt cagattcgac ttaccgatct caaggatatc aatggattgg tagcgatgag    6540

caatttggct aaccagatcc tgaacgacgt gtattgctga gccaaaggcg agcttgttgg    6600

tatagtactc ggtgaacaac ccatcgcggt tcatgatatc caaaggatcc ccgttcccgc    6660

gaacaattga aattaattct ttgcctaccc tttggatcag gcgcacatgt gggtgggacg    6720
```

```
agttgcttca agtaaaaggt taatataaaa gaatgaaaaa acacggaaca gctttgggtg     6780

tacctttcac acatttgctc aatgtgaaca гaagtgtcct cctcccaaga ctcctggtac     6840

cactgatggt ggccagcccg agcatcggcc tgaacctggt cacaccattc aatgtacttc     6900

tgggaatgga ggtcggcatt ttgacggtcg tcgggggtta tctgggctag gaaggatttg     6960

atgtagaagt aaacgattcg ctcgatggtc agaatgtcct ccttgtcccg agctatgatc     7020

aacgtcgcag ggtcctccag cagtttttcg ggcgtgaggg gtccccagac ccactttgcg     7080

aagattcggt ggtcggtcga agcagtcggg ggagagaaag gcttaaagac aatgttatca     7140

acttggaaaa gcgttgtctt ggtcgaatcg tacaccgtga tgtcgccgct caggaaatca     7200

cccttgtcgt gtgtgttgat tgtgtcaaac gcaagctcgg tttcaccaga attacccgcc     7260

gatatacaga gcgatggaat cagagtcact ctgtcaacgt gagtaggcac gtacaatgag     7320

cgtaggcgac gatctcctgg agaggaatac gctccaatga cagtctggaa cgcgatgtcc     7380

aggggcgctg ggtggagcaa gaggggctca ttgcgcaatt catccttaag tggaaggaaa     7440

gccaaggtgc cgctagcttt ggagtcggcc cttctcatgg tctgcaaacg acggaagtct     7500

ttgctgtagt catacccaag gaggtcaagt tcccgataga agaaatcgat gttgacattg     7560

ttcatctggg ggtactcttc ctcaggtggc ggcaaaagct gcgatgacgg tgatgcctcg     7620

ccaagggtta tgacgatttg gcctttggcg gatgtcgaaa gctcactctc ctttgccaga     7680

caggaatcaa taacaaattt gaccgtgact ₊ggccatccg catcattgtc actggtgact     7740

tcggctgtca agttcagctc cacggaggtg ttttcatctt caaacacgat ggctttgttg     7800
```

```
atgctcatgt ccaagatttc caggagctga acttgggcgg cacgctcacc agccaccttc      7860

atggcagctt ccatggccat aattatgtac ccagcagcgg ggaacacagt ctggccttgt      7920

agcgcatgac cgtcgagcca ttccagatcc cggggcctga tgaagtttgt ccactggaag      7980

gtcgatgctg tgctgtaaga agaaagcttt ccaagcagaa gatggggcgc acctccacga      8040

agatgctggc gggtggagcg agattctgcc cagtattgac gagtatgatc ccaagagtat      8100

gtgggcaatg actttgacag gttttgaacg gcacgatcgg gccggacttg ttgtacgaag      8160

ccctcggcgt cgatactccg aactccgaaa cgctcccaaa tgtatcccag acctccagca      8220

aaagcgtcca catcgtcaac gtttcgtgcc aagcacccgg tatacggcag ctccacaccg      8280

gcaagagcat ccttgatggt ggctagacac ggacccttga gagcagggtg ggcgccaatt      8340

tcgatggcga cgtcgattag acgatgagtg atgactgctt tctgcacagc ctgcgagaac      8400

aagaccggag agacgagatt gtctttccaa taagcgggca tcacatcctg tacagtcatt      8460

tgcttgctgg tctcgtggac ggcagagaac caagcaacac tatcgttacc ttggccatcg      8520

gcaacagcac agtcgcactc cagcaatgcc ttgacatatg gagctgcgca tgggtgcatg      8580

tgatgcgaat ggtaggcctt gtcaactctc aagattctgg caaaagtgga ttcatcctcc      8640

aagacacctt caacgtgctg gatagcatcc atgtcgccgg agaaggtcac actatccggt      8700

gaattgctag cggcgacgca gacccgaccc tcaaaggctt cgagctcgca tagttccttt      8760

gcgtcatcgt acgacatacc tgccgctagc atagcgcctg tctggccgct tggagaagag      8820

gcatgctccg cggacacaac tccacgcaga tgcgcaatac ggatagcttg agtggcactg      8880
```

```
atgaatcctg ccgcaaaggc acaggcaatc tcacctgaac tgtggccgac aattgcactg      8940

aactcgatac cagctgcagc gagaagtcgg accagaacga tttgtacggc gcagcataga      9000

ggctgggaga agctggcgag tctgacgttt gaggcatccc cttcaagcat gagctggtca      9060

tacagtgtcc acgtaggccg atacttttca ggcagtgttt gcagtgaatt atccagctct      9120

tcgagaatgc ctctcacaaa tggcataccc accatgagct tcttcagcat gcccggccac      9180

tgtgcacctt ggccagtaaa gacacctagt acgcgagggt tgtcattcgc gtcggtgcgg      9240

aagtcggtga cgacctcacc gtccgcgatg gcagcctcca gtgccgcgcg ggctacttcc      9300

ttgttgtgtg ctgcaatcgc acgacggaag ggcaagatag accgtttctc aagtaaggta      9360

tatgcgatat catgcatgtc cacgtcatca tgcgtttcca gaaattggag catattttct      9420

agcgttgcct tcatggagcg ctgcgacttc gatgaaagca caaggggcaa gctgcatgca      9480

tctgcatctg aggtcacctc tgttaccact gctgtcggct tgtgtggagg agccatatac      9540

tcttcgataa tagcatgggc atttgtacca ccaaatcctg atgtgtttat atgtttagct      9600

aacttcactt tcgttctcaa gaagtgcagt tgaatcctta ccaaatgaat taacgctgac      9660

tctgcgaggc tgcccgggcg caacaatcgg ccattctgtg gcctccgttg caattttcaa      9720

gtgcgtatag aacggagcga cacggggact gatcttctca aacagcaggt ttggcgggat      9780

cacgccattt cgtacagcaa acgatgcctt cattaagccc gcaataccag cagtgccttc      9840

cgtgtgaccg agaactgtct tgatgctgcc gacaaaaagc tcatctttct cgccgtcgct      9900

gtcgattgtt ccatccttgt gtccgaagaa ~gctgttgca atagcctcag cttcctgtgg      9960
```

gtcaccggct ggtgtaccag ttcctgggat cttcgtgtta gggagagaga gactttctgc 10020

aacttccata aggctgatac ttccagggaa taccacttac catgggcttc aaagaactgg 10080

cagcgttcct gggggttggt aatatcaaga ccagccttgg catatgtggc ccgaatgagg 10140

gcttcttgtg cgctatggtt tggcattgtg atacctgtcg ttcggccatc ttggttgata 10200

ccggtctctc ggataacaca ctcgatactg tccccgtcgc gcagtgcctg gctcagcgtt 10260

ttcaggacaa tagagcaaac accttcctaa aaagcagtta caggaggtca gtgccatctt 10320

gctttttttg aaaggaattg atgcattgtc aacttactcc tctggcatat ccatcggcag 10380

cagcatccca cattcgagat ctaccattgg gggacagcat gttcaatttg ctctccatta 10440

caaaggtcat ggggcccaat atcagattcg caccggctgc aaccgccatg gtactctcgc 10500

ccgttctaag ctgttggacg gccagatgca cggcagctaa ggatgaacta caggctgtgt 10560

cgatcgtcat ctgcagaatc agtcaggaat ctgtcagcac ttgacgaagt cgggctcgct 10620

caatgagtgg cactcacact cggcccatgc cagtcgaaga agtatgatac acggttggag 10680

gccacactga cagctacccc cgtggcagag tatgtaggaa tactatccaa ttcacgcgtc 10740

acgatagtct catagtcatg cgtcatcata ccgacgtaca cagcagtaga ggatccttga 10800

aggccttgga tccgtaggcc tgcgttggat acagcttcat agaccgtctc cagcagcagc 10860

ctttgctgtg ggtcaatcgt ttcggcctct ccagcttgga tgttgaagaa agaggcatca 10920

aaaccgcgta gatcctcctg cagcaagtat gcaaagggtg cgttcgtgcg cccgggggtga 10980

gtgccatcgg ggctgtaaaa tgtatcgacg tcaaatctct ccttagggat cttggtctgt 11040

```
acatcccggg gctctttgag cagctcccaa agttttgatg gtgtgttgac accacctgga   11100

aaccgacaac cgcttcccac taccacaatt ggctcgtttg gatagttggc ttgatccata   11160

actgctgatc ctgtttttgg gcgataggat tgggattaaa ccttgtcttg cgtcagtaga   11220

tcttctcact gcatgccggg cacaacattt gttcttacag aatcgcagag ttgaatctct   11280

gagcgaacaa gccggccttg caaccgatac cgtcgttata tttacttgca cgtatcagta   11340

ctcatctaga ttcggacaat ttcaagatcc attctagtac tcaaatgccc ccacttccca   11400

gcaatgcaag ctcggcacct agcaaaccct cccggcgtca ttcggtgcac gaatagccat   11460

tcctccatac ggcgttattc ggtcacacga ggctgaatga atcaaacgtg aatatcaatt   11520

ggctgtatca aggtgaaacc gagttttttca ctcggattgt tcttgtgctg ctcggtgaag   11580

ctgctcctaa aggaaacaac cgaactgccc catccaggta aacttcgatt gggggggggg   11640

tttttttttt ttcaaggttg actggaagag tgctctcggc cacaaaatcc cagaagcatt   11700

agtgctgtta ttcgattata aaccgtcgca gcgctctcat tcttcgctct ttcttctttt   11760

ccactggtgt gcataggtcc tatctgtctc acgcaatgct cggccaggtt cttctgaccg   11820

tcgaatcgta ccaatgggta tcgacccctc aagcccttgt ggcggtcgca gtgcttctta   11880

gtctcatcgc ctaccgtttg cgggggcgcc agtccgaact gcaagtctat aatcccaaaa   11940

aatggtggga gttgacgacc atgagggcta ggcaggactt cgatacgtat ggtccgagct   12000

ggatcgaagc ttggttctcg aaaaacgaca agcccctgcg cttcattgtt gattccggct   12060

attgcaccat cctcccatcg tccatggccg acgagtttcg gaaaatcaaa gatatgtgca   12120
```

```
tgtacaagtt tttggcggat gtatgacctc tgaattttcc attgttgtaa ctcaatgacg   12180

tctctaagat tctgatgaat gtataggact ttcactctca tctccctgga ttcgacgggt   12240

tcaaggaaat ctgccaggat gcacatcttg tcaacaaagt tgttttgaac cagttacaaa   12300

cccaagcccc caagtacaca aagccattgg ctaccttggc cgacgctact attgccaagt   12360

tgttcggtaa aagcgagggt aagtgtcaat ttttctgtct tgagcattga gcctctggct   12420

gacataccgc gaatatacta gagtggcaaa ccgcacctgt ctattccaat ggattggacc   12480

ttgtcacacg aacagtcaca ctcattatgg tcggcgacaa aatctgccac aatgaggagt   12540

ggctggatat tgcaaagaac catgccgtga gtgtggcggt acaagctcgc caacttcgcg   12600

tatggcccat gctactgcga ccgctcgctc actggtttca accgcaagga cgcaaattgc   12660

gtgaccaagt gcgccgcgca cgaaagatca ttgatcctga gattcagcga cgacgtgctg   12720

aaaaggccgc atgtgtagcg aagggcgtgc agccgcccca gtacgtcgat accatgcaat   12780

ggtttgaaga caccgccgac ggccgctggt acgatgtggc gggtgctcag ctcgctatgg   12840

atttcgccgg catctacgcc tcgacggatc ttttcgtcgg tgcccttgtg gacattgcca   12900

ggcacccaga ccttattcag cctctccgcc aagagatccg cactgtaatc ggagaagggg   12960

gctggacgcc tgcctctctg ttcaagctga gctcctcga cagctgcatg aaagagacgc    13020

agcgaatcaa gccggtcgag tgcgccacta tgcgcagtac cgctctcaga gacatcactc   13080

tatccaatgg cctcttcatt cccaagggcg agttggccgc tgtggctgca gaccgcatga   13140

acaaccctga tgtgtgggaa aaccccgaaa attatgatcc ctaccgattt atgcgcatgc   13200
```

gcgaggatcc agacaaggcc ttcaccgctc aattggagaa taccaacggt gatcacatcg 13260

gcttcggctg gaacccacgc gcttgtcccg ggcggttctt cgcctcgaag gaaatcaaga 13320

ttctcctcgc tcatatactg attcagtatg atgtgaagcc tgtaccagga gacgatgaca 13380

aatactaccg tcacgctttt agcgttcgta tgcatccaac cacaaagctc atggtacgcc 13440

ggcgcaacga ggacatcccg ctccctcatg accggtgcta agatataaca cgcaaactaa 13500

aacaaatatg catccgtccc caggcttatt ccaatagttt ccgtcccaga gaaactaggt 13560

gctgtattag tcgagtaggt tagtaaaata aaacgcattt tattcgattg tgatgccttc 13620

tttgtaatcg aacgtggtgt agactttggc tatgtgcgag agacagaaac acagagagag 13680

agaagggaga gagtgtgtat tcctgctacg cagagcggcc atctgcttct ataccgccag 13740

ctacaccgcc acgtagggaa gtcggcagta atgaagcttt tctcccggta caatcaccga 13800

tctccccatt ctctcaggcg ttgactggcg cttacgatga cgagggctta ggctctgtta 13860

agtcttgatg ttcctactca acatccccga ctaggcgaaa gagaggacgg cgcaacgacg 13920

tggacacaag tactccctcc cgccttccga ctacatatcc acaatctgta cccactgccc 13980

gtgccaacgc ctttcgaccg ttcaacgcgc atttacaagg cttgcgggaa tcataatgga 14040

gagaaaaaga gagaactttt gacagtcaag cctccgaggt gctaagacag cttccctggt 14100

agtataaaaa gcattcactc ttccgacttc gagaacgagt gcacatgtgt actttgttgc 14160

ttctcagggc cactgtaatg gtatttcagg tatctctatt tactgctatc cagaagtcag 14220

gcattaaata gtcaggctca gcccaggctc gattcagatt ggattcaggc ttcagaccat 14280

```
ggccgctatg ctccttcgta ctatacctcc gtcgagctat acccgcttgg ccagacaaaa   14340

ggcttcactg aacccttcaa cttaactgca tttcgccaca actaactcga cgaggccggc   14400

gatggtgtta ccattcatga gctcaaagat cgacacatca acatggattt cagatgtgat   14460

ccagtttcga agttcaatgg cgacgagtga gtctacgccg acacctgcca ggttttttgga  14520

cgaggacatg tcgtcttctg ccagaccaaa cattcgcatc agcttttccg tcattgcttt   14580

gaggacgata gaaatggcct cgtcgtgaga ggtgaccctg cttagttggg cccgcacgcc   14640

atctggtcct tttttatgcg aagagacaaa ggattggtct gcatgaagga cttggcggta   14700

tttaagtccc acaaaccgct gttcctgtat ccagtttgcc tcggtccagt gagcacccgg   14760

ggatgtgttg attcctgtaa ccacagctgc gggaggtgat ggaaattgag gggaagaaca   14820

caggattgcc ttctccaaca catccatgac gtccttttca tgcataggct tgtaacctat   14880

tctagcgagc cggtcggcca caccacggcc agtttcagcc acgtatccaa cagacttgac   14940

catgcccaag tcaatggtga cagccggcat gccatgggct ctccggtggt gcgcaagtgc   15000

gtcctggaat gcaccagcag ctgcgtaatt ggcctggcct gccccaccca tgaccccaac   15060

aagggatgag agcatcacga agaagtcaac atcctgtgcg atcttgtgaa gataccaact   15120

accctgtact tttgggcgtg ttgctgcatt aaattcatcc aatgtcattc gcgatagaag   15180

cgcgtccttg agaaccatgg caccttgtat gatacctcga attggcggtg catgtgcttc   15240

ttcgcacaac cggagcacct tggtgacctg atcttgatct gagatgtcac atgcgtgtag   15300

atagacagcg cactgttgat tttgcaagct ggttatgaat ggactggcct ttgcacttct   15360
```

```
cgataggata atcaagtgct tcgcgccatg atcaacaagc cactgacaga tctgctttcc    15420

aattcccccc agcccaccag caactaggta agaactgtca ggcttcagct tcagcgagaa    15480

ccctccatcg ccgactggga ccagttcgtc cccagataca ttgaccacaa ctttgccaac    15540

atgctgacca ctctgcatcg tacggaaggc cttctcgatg tttgacaagg agtgctgctg    15600

gattggacca atcaagccaa tcgcttttgt ctcgaggagt tttgtgacat ggttcaacgc    15660

ttcggatact tcttcacttt tggctctttg ccacgagaga agatcaattg atgtgaaaga    15720

gacgtcccgg gtgaatggca gcatgtcaag tctgctgttt tgctccaggt cctttttcc     15780

aatctcaaca aatctgccga attcggccat gcagtcaaag cttgcttgga ggagttgacc    15840

tgccaatgag tttagaacga catgaacgcc aagtccgccc gtgtaggctt tgatgccgtc    15900

gacgaataag tcattcctgc tcgagaagat atgatccgga ttgatgccga atttatcgcc    15960

gacaaagtca cgcttggctt gagttcccgc tgtgacgaag acctcggcac ccgcaagctg    16020

ggacaaaatg atcgctgctt gaccgacgcc tccagctcca ctgtggatca agactctttc    16080

gcctcgtcgt agctttgccg tggtataaag cgcaatatat gcggtagtga aagccagggg    16140

gaccgaagcg gcttctggga agcccatttc gtccggaata cggacgacat tagtgtacgg    16200

cgtctgtgtt ctggtcgccc aatggccttt cagtagtgca catacgcggt cccctaatct    16260

gaggccttgg ctagcggcag cagctccacc gagctttgtg atcactccgg cgcattcgaa    16320

gcccatcaca cggttggcct ccaattgacc catggcaacc atgacatccc gaaaattgag    16380

accgaaagct ttgggttcga tttctaccca atcatccgga agatccttgc cttcacgtcc    16440
```

```
ttcgtcgtct cgaaattgca gggagtctaa gagccctggc gtctcaacct ccatccgcag   16500

acgacgcccg ggttgctcga acggctgcag tgtgacctca accgcttctt ggtccttcca   16560

gtgcgggtca ttgaaaagtc gcggtacgtg gatgacgccg tttctctctg caaattcaaa   16620

ctccttgtct tcggaaaggt cgccgaggcg gccattgaag atattgcaga tagcatacag   16680

ggactcgtgg gtgtatgcgt ttcgagaagg atcgagatcc aacgatacat attccttccc   16740

gttattttcg ttgcggatgg tacgcagcag accaatatgt agagctttcc atggatcctc   16800

ggagctcatg gctgctcctc tagacaccca gagaagtgcg ttgcagttat tcagcatcgc   16860

ggtgatggat ttgaaggtct cgcttcccac ctctccaagg agcgaggact ccatttcccc   16920

aagaaaaatg catgtccttc cagtggtatc tacctcgccc agagcgttga tcgatgggct   16980

agaactggtc ttttcacaaa ttgctgcctg gagactttcc agccaagatg aaggaggtcg   17040

gagcgctccg tgcagcaaaa gcacctccga ttctgccact gtatccgggg ttgtattctc   17100

ttttctagcc gtcgatagca ttgtgctgat catgtaaaac tcatcgtctt cacaatcacg   17160

aacctccaat tccacaccgt tgaaaccgct cgtgtccaac atggtgttcc aaagatcggt   17220

agtgagcgat ggcgtcgact tccgctcagg ctcctcactg agccaccaac ctggcaacag   17280

tccgaaggta aagaacaaat cgagctgatc cctggtagtc tcaaccaaaa tcaagttgcc   17340

cccaggcttg agcaattttc gaacgttact cagtgttcgt ttcatgcatc gagttgcatg   17400

caggacctgg caagccacga ccacatcgta ggtggcacat tcaaaccctt gttgctcggg   17460

atcgctttca atatccaatt ttttgaaagt catcacgtct tgccaatccg caaattgctc   17520
```

acgcgccgac tcgaaaaacc cggcagacac atcggtgaag tcataacgat cgatcggctt 17580

ggtgtttccc aatgcattga caataagctt tgtgcagccg cccgtgcctc cgccaatctc 17640

caaaatgcga gaacgcgggt tcttgtgggc gcaaagtcgg atcagctcgc tggcttgtgc 17700

gtttgatcgg ctccatttga ttgcgttgac gtagtatctg cttagcagct gatcttgcat 17760

catcaactca agtggctctg tttcgcggcg tagcattgct attaactgag gtcctagacg 17820

agaaatcatc tcgccattga cgctttctcc agcgactctg gcctgtaggc atttcttctg 17880

ctcagcatcg tcacttagcc agtcgcaact ggctgggctg agcttgtttt gtctcgcaag 17940

gtccaattgg acattcatcc aatcgaaata cttctgaagg tggccatcca gatgttggat 18000

atcagaattt gtcaaatcag tgacagcctc ctgtataaag ttgatcgtgc atcttcggag 18060

gtccatcatg agttccgttt ctttcgtctc agcctcagtg ctcaactttt ctttgagcca 18120

agtggagtca cccaagctga tgtcaggggc ccaaacccag gagctgcagg cattttctgt 18180

gtcgttggag tctgactttt ggtcagagaa gctgcttcca accgactgga aaacaaggcc 18240

ttcaatctct atgactggga ttccgtccga gggagaagaa ccgctatcat agtcatcaaa 18300

cactgccaag tcggtagaga aggattgaga gttgcgatcc ttgatgctgg cctgtgcgtc 18360

cagagcatca ccagcctcca agtcagccag gctagaggat attttgacat ttcttagcct 18420

ccttggtacc atggccgttt tcatacgtgt tcccgcgtag ggtaacaccg tgtatgccgc 18480

ctggatcacc gagtccagag tagtaggatg gacgatgtgt cgattctcgt acgagtgagg 18540

catagccgag gcagtgtcag caatggaaaa tctgcaaaac gagccctgtc cattgttttg 18600

```
aattcgctga atgttctgaa aaatgggtcc gtggcatatc ccattcgcgt gtaaggactc   18660

ccagagatcg ttgggatcaa tgctccggtt atctgagcct agattcaacc tgcgtgaggc   18720

ttccacagtt gaacagtcaa ggtggcttct ttcgctctcc gaacgtatta atccggtgca   18780

gtgttctgtc caggtattat tttcgcccga aattgagtgc acagaaaatt gatgccagtt   18840

ctttgtgccg agggaccttt cctcacatga acggatcgtt aggcgcaggt caacctctgc   18900

ttctgcatca gcgggtatta tgagagcctg cgcgagttca acgtcacgca agttgtagtt   18960

gatgctagcc cccgcaactg gtgggcagac ttgtgaaaac ccctcgatgg ccatgctgat   19020

gaagccagct cccggaaaga tgatgctcga accaacgacg tgatctcgta tccatggaat   19080

atctgacaga cggagaacat gtttccattt aggcgcgaaa tgaggagaga gagattcccg   19140

tgagcctatc aaagtgtgag gcggatgggt tctctgtttg gactcacgac tgccgcgagg   19200

ctctctccaa taacgggttt ggtgattcca cgggtacgcc ggcaaatcgc tcagtacctt   19260

cactctgggc tcttttcttc catgaggaaa gtttatagcg tccatttga gcccataacc   19320

cttgcttatc aactccgtag cagcacgata cattgtctcc aacgagcttc tgccgcgaga   19380

aaggcaactg agatagttta tatctgttcc tttcagaccc agatcctgca tgacttggtt   19440

gattggacca ccaagcgctc cgtgaggccc tatttcaata atcacatcga cggctttctc   19500

tttggtgttg ggatcaaagc acatctcgcg gagtgaggac tcgaactcta ccggctgtag   19560

catactatcc atccagtgtg tgggatccaa tagcaattta agatcggtca tgcgactacc   19620

agtcttaggt gatgaatata atacaccctt tgaggtgtca gcattgggat tgtcgttgtt   19680
```

```
gttatccgag ttgaacagat ctctcagtga cgccccaaag gcatctgcca ttggtcgcat    19740

gtggcttgaa tggaaggctt cagtgacttt cagtttcctg gtaaagatgc catcggcgtg    19800

taacaacttt tcaagtttct cgattgcacc caaatctccc gacaccgtca cactacattg    19860

actgttgata catccaacca ccacacagcc gtcctcctgg ttgagacgcg aaatgtaaac    19920

attggtctca ctgcgaccaa gacccaccgc catcattcct cctttggctg ccaatgcggg    19980

cttgggctta gtggtcaata caccgcgtat ataagtgatc ccaatggccg accgcgcgga    20040

taaagcccca gctgcgtagg cagcagcagc ctctccactt gagtgactgg ttatccccgt    20100

tggccgaatt ccccatgacc aaaggagacg cacaagtgca atttggatag cggttgacag    20160

tggtagactg tattcggcat catttacccg agtcgtcagc tcatcacggt ggagctcctc    20220

tgtgcaattg aatgttagta cctcaagctt gatacagtat tacttttccc gggctcgcaa    20280

cttacccata aaattccaac tcgcgcccag ttgcttgatg tagccatcac attcaagaat    20340

cgcctgtttg aatactggga atgtattgac cagctctctg cccattgcat gccactgcgc    20400

cccctgaccg gtgaatacaa atccgagccg tactttctca ttcgctcgtt ttggttgatt    20460

ggactcatcg ctgagggcag aaacaaggcc gccaaggctg tctgctacat acactgacgt    20520

ccatggcaga atggaacggc gagagcctag tgtataggcg aggctggcga ggaagggttc    20580

cccgtcaatg tcagcgacgg atttaatgta gtctcgcagg cttgctatcg ttcgccgaca    20640

agcttgctcg tccttggcac gcacaacgta tatgcggctc tgtttggaac catcctcaac    20700

cctaccatgc tcagagttac cattgacatg cacttgatcc tctggcaggg ccaatgatgc    20760
```

```
gcgatcatat gattccaaaa tgacgtgagc attcgaacca ccaaagccga agttattgac   20820

agatgcgcga cgagtcccat ctttcacagg ccagtcttga gcagacatgg ggatctttga   20880

aacattaacc tttgaaacat ataactgaat ctgcgaatgc gcaaagcctt accttgatgt   20940

tcttttggtc aagcatcagc ttgctgttct tttgcaggaa ccgcgcatta gggggaatca   21000

agcccttctc caaggccaag gccaccttga ttatactggc caggccactg gcggcttctg   21060

tatggccaat atttgctttc acagagccaa ggtgcagagg atgtccttta aaagctgctg   21120

aaattgctga gatttcaagg gggtcaccag ttggtgttcc agttccgtgg gcctccacgt   21180

acgaggtcaa cgacatatct agcccagcct tatcgtaaca ctcctggatc agacttttct   21240

gcgccacatc actcggcgca gtaattgcgg gtgttttgcc atcctggttc agcgctgtct   21300

ctcgaatgac ggctcggata gggtcttggt ctcgcaacgc gttagggagg gcctttatta   21360

ccagagcggc aattccttcc ccgcgaccat atccattcgc tcgaggatca aaagagtacg   21420

agataccatc cggggacaaa aatctgtcat tgagcaacaa ggattgctta gttcaagact   21480

ctcgatctgg aatcttcttc ggaaaactca ccccaggttt gacatcgtaa caaaaacatc   21540

gggattgagc agaagatttg caccgataac gatggctgta tctgactccc cagtacgtaa   21600

gctctggcac gccaagtgca gtgcggtcaa tgtcgtcgaa caggccgtgt caaccgtcac   21660

gctgggacca cgtaagtcgt agaagtgtga tatccggttc gaaagcattg ttcctgagtt   21720

gccagttatg aaataacgcg gaactgtctc ggggtcacga ttgagcgaat cctgatagtc   21780

gtggtacatg acacccccaa acaccgacgt attagagcct gccataccat cgatggtgat   21840
```

accggctgga tgatggtcag tgacgtttgc ttacagtgag gatgacccac actacatacc 21900

actctccagc gattcgtaga ccacctcaag cataagccga tactgcggat ccatgcactg 21960

tccaatatta gatctctgcg tcccgggtta gatcaattga ataatcata cgctggcgac 22020

ctctgtggtc atgttgaaga acgcggcgtc aaataaagca ggatcctcgt cgatgaagtg 22080

tccacccttt acgtgggtct atccagtcat ccttggagtc agtaaccaag cttcagtgat 22140

gctcaaatct tgtgtcaaat attcaaaaca agatataaat gcatgcatgt tagatactca 22200

cggacccgac cctttcgcca ttcgggtggt atactcctct cacattgaat cgcgaggagg 22260

ggaccttaga ccaggcactg cctcctcttt caaccatttc ccaaagcttc tgtggactcg 22320

ttgcatctcc agcaaatcga catcccattc caactatggc aatgggcgtg gatgtgttag 22380

agcaagccga gcctgccatt gcggttgcgg ttgcggttgc ggttgcggtt gcggttacgg 22440

cgggggtatt gttcattcca acgttgtttc attgactgat atatcagtcg ccctggtgat 22500

aaaaccgttg atagtcttcc aacagtctac aggtccctgg catagctata gatgcataag 22560

ctgcccccga cacgtgattc atagttcggg gtttgttttc atcttggacg tgacacgata 22620

ttcgctctgt gcccatggga aaccccggac caccatgcta tgctcggggc aataccttag 22680

aggtaccggt tcgggaggca ttgtctgtcg tcacgataat cccgagtcaa aacgccgatg 22740

ggaaaccgtc gaacaagacg aaacaggtca ggccggccag gtagttttcg ggtataatgg 22800

aggctgtcag aatccgatac tccgtacaca gatgcgaaat acgcatacga gctatcaaac 22860

caaacgaatc caaaagcctt ggaaaagctt ggaaaggctt agtgggtaat cctgtcccaa 22920

```
ggtttgttga gggcctgagc gcagggtggg tcctgtaagc agttggtaat tcaatttcca   22980

acaatacaca atccccaaaa tttgcattat cggttgacta agacaagcaa acaaaatata   23040

tgcaggaagc gcaattcatc gcgagcaaac gatcatcatg agcatgtgac cctttcctct   23100

tttttctact tcggaaggcg gcatgatcat ctgtcagaac tcccaatcgg gagcaatacc   23160

ataccttacg gcaccccact cagacccatg cacaaagaaa atccatgcgc cgaatattga   23220

agccttggca acaaagcccc gtgtaactcc gaaggtatcc aaagaccgag agacgccgat   23280

ttgagagaca cgtacggagg tccacacaaa atgttcccga gtctatacac tatactccaa   23340

actgacttct tgtctacctg ggtatcttgt tcaggttgct gtttactgag ataaatgata   23400

ccggggggg gggggggggg gggggttgac actggctttt cgtggacaga ataatacccca  23460

tacatccctg cgtaagtagt cgtttcgaga agaatgtgtt tcgtggtgca ttactccgta   23520

ggcacaatat atttccattc ctcacgaagt ggcctcgtcc gggcgtgatc gatgcagctt   23580

gccgccccac caaaaaagga ccacaatacg agtcagatta gaaacgtcta acaggacgtc   23640

tatgtaagag gacgctcctt tgtatgtcgg atctaggcat gacaaaataa ctatacctag   23700

gtagtgttct gtcttattgg tcatttggcc tactttcgga acaatcttgg aagttcacat   23760

tcctaggtat cagggcaatt gattggtgtc cccagaattc ttttttctcg aataaaggat   23820

aaatttatgc ataaaaacct tggaaactga gcatagttat gagcacaaat actagttttc   23880

agtgcaattg gtcctactat cctttgcttg gtacccctta ccaattatac cctaggcagc   23940

agttgacacc ggtcatgaat ccattcataa aggtggacca gatgcaggga taaggaagcg   24000
```

aatctttccg ctgcctcagc ctcaggggcg cgcgccattt gttattttct tctactcatt 24060

tcccgtacct aggaactgtt cagttgtccc tcccaacccc ttgggccgaa caaccttcct 24120

ccaatctacg acggcagatt atacctaggc gcctaaccga ttaggttgct cattcgattt 24180

tggaggtatg cactttatct caagccctaa ttcccaattg aagtgctttt ccgtccccat 24240

ttgcagagct gactagattc ttttctcaga gactacctag ctataggtac cactccaagc 24300

tgtagcacag acctttcagc atggtcgctt cgttgctacc ctctcgcttt cgcggtaggg 24360

aatcaatgaa tcagcagcac cctctacgct cgggaaatcg ggcattgacc tccacactcc 24420

aatttctatc caaaacggcg tgtctacacc cgatccatac cgtttgcacc atagctattc 24480

tagctagtac cacatacgtt ggactactca aagacagctt cttccatggc cccgcaaacg 24540

ttgataaagc agaatggggc tctttggtcg aaggaagtcg aagcttgatc accggcccac 24600

agaatggctg gaagtggcag agcttcgacg gggatgcaga tgttctcgga gatttcaacc 24660

atcaagcact aatgaccttg gtattcccgg ggtcatatgg ggttgcatct caagcagcct 24720

caccattcct tgctcccctc cctgtgaacc tatctgtgat tgaccttccc tcaacgtcga 24780

gccctttaac cgcctattcg aaagataaag ttttcgcctt ctctgtggaa tacagcagcg 24840

cgccggaact cgtggctgct gttcaagaaa tccccaacaa cagtgccgac ctgaaattgc 24900

aggagacgca attgatcgag atggaacgcc agatgtggat catgaaggct gccagggctc 24960

acacaaaacg cagccttgct caatgggtgc acgatacctg gacagagtct cttgatctta 25020

tcaagagcgc tcaaacgctc gacgtggttg tcatggtgct aggttatata tcaatgcact 25080

```
tgactttcgt ctcactcttc ctcagcatga aaaaattggg atcgaaggtt tggctggcta   25140

caagcgtcct tttgtcgtca acatttgcct ttctcctcgg tctcgacgtg gccataagac   25200

taggggttcc gatgagcatg aggttgctat ccgaaggcct ccccttcttg gtggtgatcg   25260

ttggctttga gaagagcatc actctgacca gggctgtttt gtcctatgct gtgcagcacc   25320

gaaagcccca gaagatacag tctgaccagg gtagcgtgac agccattgct gaaagtacca   25380

tcaattacgc cgtacgaagc gccattcggg agaagggtta caatatcgtg tgccactacg   25440

tggtcgagat cctgctccta gttatcggtg ctgtcttagg catccaaggt gggctacagc   25500

acttctgtgt tctagctgca ttgatcctgt tctttgactg tctgctgctg tttacattct   25560

acactgcgat tctgtctatc aagctcgagg taaaccgcct caaacgtcat atcaacatgc   25620

ggtacgcgtt ggaagatgag ggtctcagtc agcggacggc ggagagtgtc gcgaccagca   25680

atgatgccca agacagtgca cgtacatatc tgtttggcaa tgatatgaaa ggcagcagtg   25740

ttccgaagtt caaattctgg atggtcgttg gtttccttat cgtcaacctc gtcaacatcg   25800

gctccaccct tttccaagcc tcttctagtg gatcgttgtc cagtatatca tcttggaccg   25860

aaagtctgag cggatcggcc attaaacccc cgcttgagcc cttcaaggta gctggaagtg   25920

gactagatga actacttttc caggcaagag ggcgcggtca atcgactatg gtcactgtcc   25980

tcgcccccat caagtacgaa ctagagtatc cttccattca ccgtggtacc tcgcagctac   26040

acgagtatgg agttggtgga aaaatggtcg gtagcctgct caccagcctg gaagatcccg   26100

tcctctccaa atgggtgttt gtggcacttg ccctaagtgt cgctctgaac agctatctgt   26160
```

```
tcaaggccgc cagactggga atcaaagatc ctaatctccc gagtcaccca gttgatccag  26220

ttgagcttga ccaggccgaa agcttcaacg ctgcccagaa ccagacccct cagattcaat  26280

caagtctcca agctcctcag accagagtgt tcactcctac caccaccgac agtgacagtg  26340

atgcctcatt agtcttaatt aaagcatctc taaaggtcac taagcgagca gaaggaaaga  26400

cagccactag tgaacttccc gtgtctcgca cacaaatcga actggacaat ttgctgaagc  26460

agaacacaat cagcgagttg aacgatgagg atgtcgttgc cttgtctttg cggggaaagg  26520

ttcccgggta tgccctagag aagagtctca aagactgcac tcgtgccgtc aaggttcgcc  26580

gctctatcat ttcgaggaca ccggctaccg cagagcttac aagtatgctg gagcactcga  26640

agctgccgta cgaaaactac gcctgggaac gcgtgctcgg tgcatgttgc gagaacgtta  26700

ttggctatat gccagtccct gttggcgtcg ccggtcctat tgttatcgac ggcaagagtt  26760

atttcattcc tatggcaacc accgagggcg tcctcgtcgc tagtgctagc cgtggcagta  26820

aggcaatcaa cctcggtggc ggtgccgtga cagtcctgac tggcgacggt atgacacgag  26880

gcccgtgtgt gaagtttgat gtccttgaac gagctggtgc tgctaagatc tggctcgatt  26940

cggacgtcgg ccagaccgta atgaaagaag ccttcaattc aaccagcaga tttgcgcgct  27000

tacaaagtat gcggacaact atcgccggta ctcacttata tattcgattt aagactacta  27060

ctggcgacgc tatgggaatg aatatgattt ctaagggcgt ggagcatgca ctgaatgtta  27120

tggcgacaga ggcaggtttc agcgatatga atattattac cctatcagga aattactgta  27180

cggataagaa accttcagct ttgaattgga tcgatggacg gggcaagggc attgtggccg  27240
```

```
aagccatcat accggcgaac gttgtcaggg atgtcttaaa gagcgatgtg gatagcatgg  27300

ttcagctcaa catatcgaaa aatctgattg ggtccgctat ggctggctca gttggcggct  27360

tcaacgccca agctgccaat cttgcggcag ccattttcat tgccacaggt caggatccgg  27420

cgcaagttgt ggagagcgct aactgcatca ctctcatgaa caagtaagtt gaaagcggcc  27480

gcttacttgg aaacattcac taatcctgtt tagtcttcgc ggatcgcttc aaatctctgt  27540

ctccatgccg tctattgagg ttggaacgtt gggcggtggt acgattctgg agccccaggg  27600

cgcaatgctt gacatgcttg gtgtccgcgg atcacacccg accactcccg gtgagaatgc  27660

acgtcaactt gcgcgcatca tcggaagcgc .gttttggct ggggagctct cgctatgtgc  27720

tgccctagcc gccggtcacc tggtcaaggc gcacatggcg cacaaccgtt ctgccccggc  27780

atcttcagcc ccttctcgaa gtgtctcccc gtcaggcgga accaggacag tccctgttcc  27840

taacaatgca ctgaggccga gtgctgcagc tactgatcgg gctcgacgct gattaggtcg  27900

gaatcttagg agcattccaa gctccgtacc ccctccagtg gattcattgc aggaggatca  27960

tattttttct cattggttgt tattgtcata attttcaaaa gcacaatgca atgagacagg  28020

caggtggtag agtgaacggc cagaaagggt atctcatgtt tatatgttgt tgaaatttac  28080

gatgcaagta gtagggaaga agaatatata aagagatggt ccttttccag agagtgttta  28140

ggtctgatcc ctcataatta tttaatgagt gaaagctttg ttcaagctat aacttactga  28200

gtaggttgaa tgttgatctg attcattcct gaggtatcag gattgatgcc tgaaacatca  28260

atcatccatt gtcagatgcc gtaactaact aactatgaat ctcaacatag ttatatgttg  28320
```

```
ccaatctagc cacggtgact agaaccttga gatggactta gactagacat gggtcgcggg    28380

caatgacata tagaatcttt gaaatcgaca ttaattaagt atgtggagat tctttgtgga    28440

ggcacggtaa tgtgtctatc tagcaacgcg gtcaagcatc agtctcaggc acagcccggg    28500

tgtcgttttt ggttgcaatc ttccgccatc ccattccaaa ggcaaacaca aacgtgcacg    28560

ccgtagctcc cactgctaag taaaaagtat gatcaacggc gagactgtaa gcttttacaa    28620

cccctggaag gttattcttg ctgaccacat ctctgaagcc agtcgcccct gctgccgtca    28680

cggcctgcgt gtcgacagtg ggcgcatact tgctcaggcc agttctcaaa ccggacccaa    28740

agacaaggtt agcaaagtcc aggaagagcg atcctccaaa cgtctgtcca aacacggcga    28800

gagaaattcc gagggcacct tgttcgggcg aaagcgtgct ttggatggcg atgataggct    28860

ggccattgag tattgatgtc agcgtctagc ggttgcatgc tcttcttgct ttgatacaaa    28920

gccgaaagcg tgagagatga tcaaaggttt catagcttac cgtttgcatg ccacaaccac    28980

gaccgaagcc cgcgataaat tggtacatga cccatttcac agttgatgta tggggctgga    29040

aggtggatac cagacctgcg cctatggcga cgagaacagc gctgcctagg gcccaaggca    29100

aatagtatcc tgtctttcca actggtgcgt catatgtcag tatacacgat atccaagccc    29160

gatgtcagac ggttgtggca agaaaggagc catagaaatg gacggggtgg agaaaaatgt    29220

gtacgcgagt ttcacttact tgcgaagcca gaaaccatag ccataatgac ttgtccaaga    29280

attccaggca acatgtacac accactcagt gtgggagaaa catccttcac agcctggaag    29340

tagatcggta gatagtagga aaagacaagc aaggagccag agaaaaagcc cataaataaa    29400
```

caagagcacc acacttgtcg tttaccagcc actgagccag gaatcatggc aacagcatcg 29460

ccaacatgac gctcccatag cacgaacgca atcagagcaa accctccgcc acagaacagg 29520

ccgatgatga cggaacttcg ccaggtgtag gtcgaccctc cccattctag tgcgagggaa 29580

atcatggttg cgaaggctgc aaagaccaca aagcctacaa ggtccagttt gcgaagtgtg 29640

gattttatgt tggccattgg tttgtcggtc gagagttcgc tgtccgtgga tgaaattcgg 29700

tcgggtatgg tgatgacgag aaggaggaat gcagcgacag cgccgatggg gagattgata 29760

taaaagcctg aattccaagt gagaacatgg acaacaatca taaaaaggcc aaaggtcaac 29820

atacaccatc gccaagtggc gtgttgagtg aaagcacctc cgagcagtgg tccacagaca 29880

atggcaatct gactaactga aaacatattg tcagacgacg aaccgttcgt ttggggtaca 29940

tcagatcttg agatgacata cgacccatca tcactccaat caaaacttca tatgcgaggt 30000

cagcgtgtac acggcaccca gcagacttcc aaaaatcggt tcccttacct ggttgcttgt 30060

gcttaggagc agctgttgag aggattgtga gggctccgtt gacaagacct gagcctccca 30120

ttccagcaac ggcccgccca acaatcaaca tggtggaaga tcttgcggca ccgcatagca 30180

ccgagcctag ttcaaaaata cagaggaagg caaagaaagt gtacttcaag cccaagagtg 30240

tatacaattt accggccagg ggctggagag cacagctaaa tatgatgtta gctaatctgt 30300

tcgtacaatg aacaaggtca aggagaacag agccatactt agccagaaga taagcactgc 30360

cgtaccaccc tacatcgttc agagagtgga actcgcttgt gatatgtggg attgcctgtg 30420

gctggagtca attgactgtg ctgcgctctg ttctgaggta gccaccatct taccgtgacg 30480

```
ataatggaca tatcaaggag catcaaaaat gctacgaaag taactgaagc aaccaccagc  30540

ccgagcttga ggcctgtgat gtgctgggac ttggactcag tcgcttcgag cgtgtcattt  30600

tgactttctt ccttctgtgg ccttggttcc ccttctttag ggggtagagg ttctgacatc  30660

gcgcaattcc ttccgacttt tgcttcaagg ggcggtgtga atctctactg cgcggcgctt  30720

ctatagtacc tgtgttttgg tgtatgaatg atctcgctct cgttgtttcg ttaaggtccg  30780

ctagcctgaa gtcagattga tggatgggga tcaggggaaa ttggcgacgt ctttaatttt  30840

gcttttcttt gttaccggaa gtgttgcggt attagcgtgt ctgggcttat ttacgacgca  30900

caagatgcat tgaactggcc ccactgctag atctcactag tattgtggtt gtaatttacc  30960

tatactccat attgactggg caggttttga acacaaccca cacccccccca tactacacat  31020

tagttttgca tattttcctg ggggccaaaa aaaccccaaa aggcttcaat attttgcggc  31080

caatggagag tgtaactaat ttggcccaca ctccggtggt atcaatcgga tctcactgca  31140

tatatgatga aagcaagagg gggcaggaga tacgctcttt attggctgtc tgcgcgaagc  31200

tgggcaaatg caaataaaaa gacaaacaac cagctggaag accgggcgac aaacatggtt  31260

tacctaacac cctcgatccc aacaatgtgc atgttaatca atgtgctccg tggggagtat  31320

gaactataac atacgaagca gccattcatg tcaaaaaaaa aaccaggcga atgggcgtcg  31380

tcaacggttt cacataagta ctatattgta ctaactaccc gtgagactgg agagaacagt  31440

ctcgcgcgaa gaaacgataa gagcatcggt catatcggtc catctcggtc taagtgtatg  31500

agaatattcc gacgtgaatc catccgtcag tgatcaatgt ctccaagtaa ttcatcattt  31560
```

```
caattaccct cgctttactc cgtagaatac aagaccttac tagcgcaaac aagtgggggc   31620

taacggtgtg atctccttcc gttgcggccg ccacctcggt tccagccgta atacgacgac   31680

ccgtctatcg cgaccccta gccttggcca ttttggcgt tacagtaaag ctttggagag     31740

aaacgccaag ggaaaatgct agccaccaat tctataaatt actcttcaca tgcagctagt   31800

atcactggta agtctacggg gcacatgtaa aatttttatt actttctaat aatctttcca   31860

agttcttttc cacggggccc caatgcttaa aatactcaaa agacgtgaaa aacctgcaag   31920

ccgccagtga tatcacacgt aatgcctcaa cagcctgatt ccgagccatt atatgctgtt   31980

tgatgatctc aaattgagat ggcgagcgct ggatctggga aattggtagt gggattggta   32040

tagaaacgta agtgcagaag accatgtaat aagtacatat ggaggctatg tgatggcccg   32100

atctagtttc ttcaatatag cgctgggtat aaaaaaaagc aggggctttc tcagggtaat   32160

gtcgcagtct acaacgagtg gcgtccactg acagggaaag gcgagcgggg ctatgctacc   32220

ttcaatttcc atagaggggg gatgcaccat ctccgacaat ctatagttac tcaaacaggt   32280

acggtactaa gcaatattgt gtttcttcgc taatgcgaat atttccttat agcaacgtcg   32340

caacacattt atcgtcttcc ctgaggcctt tgttgacttg ggctcttcgt ctccggcttc   32400

gtcactccaa agcacagata ggagacgaga ggccggcgtt atggttttat tttcagcgcc   32460

aaggatttgc cacgatgtgc ttggcatatc tgataggacc tattcccct ctcccggtca    32520

gcgcattgct gatgtatgca agggaagaaa agactggtgg ttatcggtcc cacttactag   32580

acgaatagat gccgcagccc cgtgctcctg tgctatcccc aaagcagtct caatctcact   32640
```

```
caatagtcga aggcttacac gcaatgtcgt gcatgcagaa gataaggcgt gcatgaatgg   32700

gtcgagatgt gaaatgagct cgccgatatg aagattagag tgaaacgagg gaagtgcttc   32760

ggctcttcca ttgtcatttc tagtggttga gccagaccag taccaatcca ttcgtgtgct   32820

ttgcttttgt ccacaaggtt gggctttcat cacctcggat agtagcagct gggaaagtga   32880

tgtcatgatt ttgacagaca acatgtagca atgcaccgcc atgaacaagt tcttggtttg   32940

cagacaccca tctaacatgc tgctattgct gctcgtgatc acacgttctt gaagatgtag   33000

tagcaatcta ccaaaggcat tcaaaaagtc ccctatcggg tctaggaaga agctttagcg   33060

acaatcaaga ggcagtaaac aggcagaatt gaaaatctca cagcttaaaa ttttttgctt   33120

gggccattcc acagtcaccc cgtggagtat tacctctagg tcctgtgaca catccgacag   33180

actttcgaaa aggtctcgtt gcgtgttgct tgtgttggat tgtccggatg acgagttccc   33240

ctctacttcg aggtcaaaca gcgatggcga gacaggcgcc gttgcatcca aagggccttc   33300

aaagtcgtag cctagatctg gtatccccga agattcattg ctgttggcat cgtcgcgaaa   33360

tgtatttggc tgaggccagc cgccgggaaa cgactcggga tcatcaaagt tgattgatgt   33420

atcatagaat tgcagggttg ccgctgatgg ttctgataat gtttccttga gtgccgaggt   33480

gccaatatgc gtaggtggtg agcagtaagg tggaggagtc tctgccaatg atgagaagac   33540

cgtagaagat gtcgcggtca tcggttgtga ggtttctgtg gctcttgtag ttccagctgc   33600

ggcttcttta tgtaaattgc gcttgggtag cctttcgctg tacacacacc ttaatccggc   33660

ttgttgacaa cgttgacact gagcacggac taaattggca ttgctaccgg tacatttgag   33720
```

cttttgtgca tgacaccggt cacatgagcg tcgaaacgcg cgacggcgta ggttcgtcgg   33780

aatcgttgca tgcggcaggg acataattat tggattaaga tcaaataatg tgaggtgaga   33840

ctttgcatgt tcctggatct ttatgtattg gaattggaga gtaagctcgt gcaggagata   33900

agttcaggtc gtcttgctgg aagacttact aagttatatg caaacaagtg ttttcgagcg   33960

gacaccaaaa gccaatagtc ttactatgaa tgtcttttca gtcacccgga gaaatactct   34020

tagcctctgc tcttatgcga gctcatcaaa gctgggcata cataccccat ccagcgccac   34080

gtattacact agaaagagtt ctaaaagaaa tagattcggc cccccatctg gctatcatat   34140

atgccagatg aaatacctgt aacgtggggc ataaaaaggc aggctctagt ctaccagcag   34200

atc   34203

<210> 2
<211> 34203
<212> DNA
<213> Penicillium citrinum

<400> 2
gatctgctgg tagactagag cctgcctttt tatgccccac gttacaggta tttcatctgg   60

catatatgat agccagatgg ggggccgaat ctatttcttt tagaactctt tctagtgtaa   120

tacgtggcgc tggatggggt atgtatgccc agctttgatg agctcgcata agagcagagg   180

ctaagagtat ttctccgggt gactgaaaag acattcatag taagactatt ggcttttggt   240

gtccgctcga aaacacttgt ttgcatataa cttagtaagt cttccagcaa gacgacctga   300

acttatctcc tgcacgagct tactctccaa ttccaataca taaagatcca ggaacatgca   360

aagtctcacc tcacattatt tgatcttaat ccaataatta tgtccctgcc gcatgcaacg   420

attccgacga acctacgccg tcgcgcgttt cgacgctcat gtgaccggtg tcatgcacaa   480

aagctcaaat gtaccggtag caatgccaat ttagtccgtg ctcagtgtca acgttgtcaa   540

caagccggat taaggtgtgt gtacagcgaa aggctaccca agcgcaattt acataaagaa   600

gccgcagctg gaactacaag agccacagaa acctcacaac cgatgaccgc gacatcttct   660

acggtcttct catcattggc agagactcct ccaccttact gctcaccacc tacgcatatt   720

ggcacctcgg cactcaagga aacattatca gaaccatcag cggcaaccct gcaattctat   780

gatacatcaa tcaactttga tgatcccgag tcgtttcccg gcggctggcc tcagccaaat   840

acatttcgcg acgatgccaa cagcaatgaa tcttcgggga taccagatct aggctacgac   900

tttgaaggcc ctttggatgc aacggcgcct gtctcgccat cgctgtttga cctcgaagta   960

gaggggaact cgtcatccgg acaatccaac acaagcaaca cgcaacgaga ccttttcgaa   1020

agtctgtcgg atgtgtcaca ggacctagag gtaatactcc acggggtgac tgtggaatgg   1080

cccaagcaaa aaattttaag ctgtgagatt ttcaattctg cctgtttact gcctcttgat   1140

tgtcgctaaa gcttcttcct agacccgata ggggactttt tgaatgcctt tggtagattg   1200

ctactacatc ttcaagaacg tgtgatcacg agcagcaata gcagcatgtt agatgggtgt   1260

ctgcaaacca agaacttgtt catggcggtg cattgctaca tgttgtctgt caaaatcatg   1320

acatcacttt cccagctgct actatccgag gtgatgaaag cccaaccttg tggacaaaag   1380

caaagcacac gaatggattg gtactggtct ggctcaacca ctagaaatga caatggaaga   1440

gccgaagcac ttccctcgtt tcactctaat cttcatatcg gcgagctcat ttcacatctc   1500

gacccattca tgcacgcctt atcttctgca tgcacgacat tgcgtgtaag ccttcgacta   1560

ttgagtgaga ttgagactgc tttgggggata gcacaggagc acggggctgc ggcatctatt   1620

cgtctagtaa gtgggaccga taaccaccag tcttttcttc ccttgcatac atcagcaatg   1680

cgctgaccgg gagaggggga ataggtccta tcagatatgc caagcacatc gtggcaaatc   1740

cttggcgctg aaaataaaac cataacgccg gcctctcgtc tcctatctgt gctttggagt   1800

gacgaagccg gagacgaaga gcccaagtca acaaaggcct cagggaagac gataaatgtg   1860

ttgcgacgtt gctataagga aatattcgca ttagcgaaga aacacaatat tgcttagtac   1920

cgtacctgtt tgagtaacta tagattgtcg gagatggtgc atcccccctc tatggaaatt   1980

gaaggtagca tagccccgct cgcctttccc tgtcagtgga cgccactcgt tgtagactgc   2040

gacattaccc tgagaaagcc cctgcttttt tttataccca gcgctatatt gaagaaacta   2100

gatcgggcca tcacatagcc tccatatgta cttattacat ggtcttctgc acttacgttt   2160

ctataccaat cccactacca atttcccaga tccagcgctc gccatctcaa tttgagatca   2220

tcaaacagca tataatggct cggaatcagg ctgttgaggc attacgtgtg atatcactgg   2280

cggcttgcag gttttttcacg tcttttgagt attttaagca ttggggcccc gtggaaaaga   2340

acttggaaag attattagaa agtaataaaa attttacatg tgccccgtag acttaccagt   2400

gatactagct gcatgtgaag agtaatttat agaattggtg gctagcattt tcccttggcg   2460

```
tttctctcca aagctttact gtaacgccaa aaatggccaa ggctaggggg tcgcgataga     2520

cgggtcgtcg tattacggct ggaaccgagg tggcggccgc aacggaagga gatcacaccg     2580

ttagcccca cttgtttgcg ctagtaaggt cttgtattct acggagtaaa gcgagggtaa     2640

ttgaaatgat gaattacttg gagacattga tcactgacgg atggattcac gtcggaatat     2700

tctcatacac ttagaccgag atggaccgat atgaccgatg ctcttatcgt ttcttcgcgc     2760

gagactgttc tctccagtct cacgggtagt tagtacaata tagtacttat gtgaaaccgt     2820

tgacgacgcc cattcgcctg gttttttttt tgacatgaat ggctgcttcg tatgttatag     2880

ttcatactcc ccacggagca cattgattaa catgcacatt gttgggatcg agggtgttag     2940

gtaaaccatg tttgtcgccc ggtcttccag ctggttgttt gtctttttat ttgcatttgc     3000

ccagcttcgc gcagacagcc aataaagagc gtatctcctg ccccctcttg ctttcatcat     3060

atatgcagtg agatccgatt gataccaccg gagtgtgggc caaattagtt acactctcca     3120

ttggccgcaa aatattgaag cctttgggg ttttttggc ccccaggaaa atatgcaaaa      3180

ctaatgtgta gtatggggg gtgtgggttg tgttcaaaac ctgcccagtc aatatggagt      3240

ataggtaaat tacaaccaca atactagtga gatctagcag tggggccagt tcaatgcatc     3300

ttgtgcgtcg taaataagcc cagacacgct aataccgcaa cacttccggt aacaaagaaa     3360

agcaaaatta aagacgtcgc caatttcccc tgatccccat ccatcaatct gacttcaggc     3420

tagcggacct taacgaaaca acgagagcga gatcattcat acaccaaaac acaggtacta     3480

tagaagcgcc gcgcagtaga gattcacacc gccccttgaa gcaaaagtcg gaaggaattg     3540
```

```
cgcgatgtca gaacctctac cccctaaaga aggggaacca aggccacaga aggaagaaag    3600

tcaaaatgac acgctcgaag cgactgagtc caagtcccag cacatcacag gcctcaagct    3660

cgggctggtg gttgcttcag ttactttcgt agcatttttg atgctccttg atatgtccat    3720

tatcgtcacg gtaagatggt ggctacctca gaacagagcg cagcacagtc aattgactcc    3780

agccacaggc aatcccacat atcacaagcg agttccactc tctgaacgat gtagggtggt    3840

acggcagtgc ttatcttctg gctaagtatg gctctgttct ccttgacctt gttcattgta    3900

cgaacagatt agctaacatc atatttagct gtgctctcca gcccctggcc ggtaaattgt    3960

atacactctt gggcttgaag tacactttct ttgccttcct ctgtattttt gaactaggct    4020

cggtgctatg cggtgccgca agatcttcca ccatgttgat tgttgggcgg gccgttgctg    4080

gaatgggagg ctcaggtctt gtcaacggag ccctcacaat cctctcaaca gctgctccta    4140

agcacaagca accaggtaag ggaaccgatt tttggaagtc tgctgggtgc cgtgtacacg    4200

ctgacctcgc atatgaagtt ttgattggag tgatgatggg tcgtatgtca tctcaagatc    4260

tgatgtaccc caaacgaacg gttcgtcgtc tgacaatatg ttttcagtta gtcagattgc    4320

cattgtctgt ggaccactgc tcggaggtgc tttcactcaa cacgccactt ggcgatggtg    4380

tatgttgacc tttggccttt ttatgattgt tgtccatgtt ctcacttgga attcaggctt    4440

ttatatcaat ctccccatcg gcgctgtcgc tgcattcctc cttctcgtca tcaccatacc    4500

cgaccgaatt tcatccacgg acagcgaact ctcgaccgac aaaccaatgg ccaacataaa    4560

atccacactt cgcaaactgg accttgtagg ctttgtggtc tttgcagcct tcgcaaccat    4620
```

gatttccctc gcactagaat ggggagggtc gacctacacc tggcgaagtt ccgtcatcat   4680

cggcctgttc tgtggcggag ggtttgctct gattgcgttc gtgctatggg agcgtcatgt   4740

tggcgatgct gttgccatga ttcctggctc agtggctggt aaacgacaag tgtggtgctc   4800

ttgtttattt atgggctttt tctctggctc cttgcttgtc ttttcctact atctaccgat   4860

ctacttccag gctgtgaagg atgtttctcc cacactgagt ggtgtgtaca tgttgcctgg   4920

aattcttgga caagtcatta tggctatggt ttctggcttc gcaagtaagt gaaactcgcg   4980

tacacatttt tctccacccc gtccatttct atggctcctt tcttgccaca accgtctgac   5040

atcgggcttg gatatcgtgt atactgacat atgacgcacc agttggaaag acaggatact   5100

atttgccttg ggccctaggc agcgctgttc tcgtcgccat aggcgcaggt ctggtatcca   5160

ccttccagcc ccatacatca actgtgaaat gggtcatgta ccaatttatc gcgggcttcg   5220

gtcgtggttg tggcatgcaa acggtaagct atgaaacctt tgatcatctc tcacgctttc   5280

ggctttgtat caaagcaaga agagcatgca accgctagac gctgacatca atactcaatg   5340

gccagcctat catcgccatc caaagcacgc tttcgcccga acaaggtgcc ctcggaattt   5400

ctctcgccgt gtttggacag acgtttggag gatcgctctt cctggacttt gctaaccttg   5460

tctttgggtc cggtttgaga actggcctga gcaagtatgc gcccactgtc gacacgcagg   5520

ccgtgacggc agcaggggcg actggcttca gagatgtggt cagcaagaat aaccttccag   5580

gggttgtaaa agcttacagt ctcgccgttg atcatacttt ttacttagca gtgggagcta   5640

cggcgtgcac gtttgtgttt gcctttggaa tgggatggcg gaagattgca accaaaaacg   5700

```
acacccgggc tgtgcctgag actgatgctt gaccgcgttg ctagatagac acattaccgt    5760

gcctccacaa agaatctcca catacttaat taatgtcgat ttcaaagatt ctatatgtca    5820

ttgcccgcga cccatgtcta gtctaagtcc atctcaaggt tctagtcacc gtggctagat    5880

tggcaacata taactatgtt gagattcata gttagttagt tacggcatct gacaatggat    5940

gattgatgtt tcaggcatca atcctgatac ctcaggaatg aatcagatca acattcaacc    6000

tactcagtaa gttatagctt gaacaaagct ttcactcatt aaataattat gagggatcag    6060

acctaaacac tctctggaaa aggaccatct ctttatatat tcttcttccc tactacttgc    6120

atcgtaaatt tcaacaacat ataaacatga gatacccttt ctggccgttc actctaccac    6180

ctgcctgtct cattgcattg tgcttttgaa aattatgaca ataacaacca atgagaaaaa    6240

atatgatcct cctgcaatga atccactgga gggggtacgg agcttggaat gctcctaaga    6300

ttccgaccta atcagcgtcg agcccgatca gtagctgcag cactcggcct cagtgcattg    6360

ttaggaacag ggactgtcct ggttccgcct gacggggaga cacttcgaga aggggctgaa    6420

gatgccgggg cagaacggtt gtgcgccatg tgcgccttga ccaggtgacc ggcggctagg    6480

gcagcacata gcgagagctc cccagccaaa acagcgcttc cgatgatgcg cgcaagttga    6540

cgtgcattct caccgggagt ggtcgggtgt gatccgcgga caccaagcat gtcaagcatt    6600

gcgccctggg gctccagaat cgtaccaccg cccaacgttc caacctcaat agacggcatg    6660

gagacagaga tttgaagcga tccgcgaaga ctaaacagga ttagtgaatg tttccaagta    6720

agcggccgct ttcaacttac ttgttcatga gagtgatgca gttagcgctc tccacaactt    6780
```

gcgccggatc ctgacctgtg gcaatgaaaa tggctgccgc aagattggca gcttgggcgt   6840

tgaagccgcc aactgagcca gccatagcgg acccaatcag atttttcgat atgttgagct   6900

gaaccatgct atccacatcg ctctttaaga catccctgac aacgttcgcc ggtatgatgg   6960

cttcggccac aatgcccttg ccccgtccat cgatccaatt caaagctgaa ggtttcttat   7020

ccgtacagta atttcctgat agggtaataa tattcatatc gctgaaacct gcctctgtcg   7080

ccataacatt cagtgcatgc tccacgccct tagaaatcat attcattccc atagcgtcgc   7140

cagtagtagt cttaaatcga atatataagt gagtaccggc gatagttgtc cgcatacttt   7200

gtaagcgcgc aaatctgctg gttgaattga aggcttcttt cattacggtc tggccgacgt   7260

ccgaatcgag ccagatctta gcagcaccag ctcgttcaag gacatcaaac ttcacacacg   7320

ggcctcgtgt cataccgtcg ccagtcagga ctgtcacggc accgccaccg aggttgattg   7380

ccttactgcc acggctagca ctagcgacga ggacgccctc ggtggttgcc ataggaatga   7440

aataactctt gccgtcgata acaataggac cggcgacgcc aacagggact ggcatatagc   7500

caataacgtt ctcgcaacat gcaccgagca cgcgttccca ggcgtagttt tcgtacggca   7560

gcttcgagtg ctccagcata cttgtaagct ctgcggtagc cggtgtcctc gaaatgatag   7620

agcggcgaac cttgacggca cgagtgcagt ctttgagact cttctctagg gcatacccgg   7680

gaacctttcc ccgcaaagac aaggcaacga catcctcatc gttcaactcg ctgattgtgt   7740

tctgcttcag caaattgtcc agttcgattt gtgtgcgaga cacgggaagt tcactagtgg   7800

ctgtctttcc ttctgctcgc ttagtgacct ttagagatgc tttaattaag actaatgagg   7860

catcactgtc actgtcggtg gtggtaggag tgaacactct ggtctgagga gcttggagac   7920

ttgattgaat ctgaggggtc tggttctggg cagcgttgaa gctttcggcc tggtcaagct   7980

caactggatc aactgggtga ctcgggagat taggatcttt gattcccagt ctggcggcct   8040

tgaacagata gctgttcaga gcgacactta gggcaagtgc cacaaacacc catttggaga   8100

ggacgggatc ttccaggctg gtgagcaggc taccgaccat ttttccacca actccatact   8160

cgtgtagctg cgaggtacca cggtgaatgg aaggatactc tagttcgtac ttgatggggg   8220

cgaggacagt gaccatagtc gattgaccgc gccctcttgc ctggaaaagt agttcatcta   8280

gtccacttcc agctaccttg aagggctcaa gcgggggttt aatggccgat ccgctcagac   8340

tttcggtcca agatgatata ctggacaacg atccactaga agaggcttgg aaaagggtgg   8400

agccgatgtt gacgaggttg acgataagga aaccaacgac catccagaat ttgaacttcg   8460

gaacactgct gcctttcata tcattgccaa acagatatgt acgtgcactg tcttgggcat   8520

cattgctggt cgcgacactc tccgccgtcc gctgactgag accctcatct tccaacgcgt   8580

accgcatgtt gatatgacgt ttgaggcggt ttacctcgag cttgatagac agaatcgcag   8640

tgtagaatgt aaacagcagc agacagtcaa agaacaggat caatgcagct agaacacaga   8700

agtgctgtag cccaccttgg atgcctaaga cagcaccgat aactaggagc aggatctcga   8760

ccacgtagtg gcacacgata ttgtaaccct tctcccgaat ggcgcttcgt acggcgtaat   8820

tgatggtact ttcagcaatg gctgtcacgc taccctggtc agactgtatc ttctggggct   8880

ttcggtgctg cacagcatag gacaaaacag ccctggtcag agtgatgctc ttctcaaagc   8940

caacgatcac caccaagaag gggaggcctt cggatagcaa cctcatgctc atcggaaccc   9000

ctagtcttat ggccacgtcg agaccgagga gaaaggcaaa tgttgacgac aaaaggacgc   9060

ttgtagccag ccaaaccttc gatcccaatt ttttcatgct gaggaagagt gagacgaaag   9120

tcaagtgcat tgatatataa cctagcacca tgacaaccac gtcgagcgtt tgagcgctct   9180

tgataagatc aagagactct gtccaggtat cgtgcaccca ttgagcaagg ctgcgttttg   9240

tgtgagccct ggcagccttc atgatccaca tctggcgttc catctcgatc aattgcgtct   9300

cctgcaattt caggtcggca ctgttgttgg ggatttcttg aacagcagcc acgagttccg   9360

gcgcgctgct gtattccaca gagaaggcga aaactttatc tttcgaatag gcggttaaag   9420

ggctcgacgt tgagggaagg tcaatcacag ataggttcac agggagggga gcaaggaatg   9480

gtgaggctgc ttgagatgca accccatatg accccgggaa taccaaggtc attagtgctt   9540

gatggttgaa atctccgaga acatctgcat ccccgtcgaa gctctgccac ttccagccat   9600

tctgtgggcc ggtgatcaag cttcgacttc cttcgaccaa agagccccat tctgctttat   9660

caacgtttgc ggggccatgg aagaagctgt ctttgagtag tccaacgtat gtggtactag   9720

ctagaatagc tatggtgcaa acggtatgga tcgggtgtag acacgccgtt ttggatagaa   9780

attggagtgt ggaggtcaat gcccgatttc ccgagcgtag agggtgctgc tgattcattg   9840

attccctacc gcgaaagcga gagggtagca acgaagcgac catgctgaaa ggtctgtgct   9900

acagcttgga gtggtaccta tagctaggta gtctctgaga aaagaatcta gtcagctctg   9960

caaatgggga cggaaaagca cttcaattgg gaattagggc ttgagataaa gtgcatacct   10020

ccaaaatcga atgagcaacc taatcggtta ggcgcctagg tataatctgc cgtcgtagat   10080

tggaggaagg ttgttcggcc caaggggttg ggagggacaa ctgaacagtt cctaggtacg   10140

ggaaatgagt agaagaaaat aacaaatggc gcgcgccct gaggctgagg cagcggaaag   10200

attcgcttcc ttatccctgc atctggtcca cctttatgaa tggattcatg accggtgtca   10260

actgctgcct agggtataat tggtaagggg taccaagcaa aggatagtag gaccaattgc   10320

actgaaaact agtatttgtg ctcataacta tgctcagttt ccaaggtttt tatgcataaa   10380

tttatccttt attcgagaaa aaagaattct ggggacacca atcaattgcc ctgataccta   10440

ggaatgtgaa cttccaagat tgttccgaaa gtaggccaaa tgaccaataa gacagaacac   10500

tacctaggta tagttatttt gtcatgccta gatccgacat acaaaggagc gtcctcttac   10560

atagacgtcc tgttagacgt ttctaatctg actcgtattg tggtcctttt ttggtggggc   10620

ggcaagctgc atcgatcacg cccggacgag gccacttcgt gaggaatgga aatatattgt   10680

gcctacggag taatgcacca cgaaacacat tcttctcgaa acgactactt acgcagggat   10740

gtatgggtat tattctgtcc acgaaaagcc agtgtcaacc cccccccccc cccccccccc   10800

cggtatcatt tatctcagta aacagcaacc tgaacaagat acccaggtag acaagaagtc   10860

agtttggagt atagtgtata gactcgggaa cattttgtgt ggacctccgt acgtgtctct   10920

caaatcggcg tctctcggtc tttggatacc ttcggagtta cacggggctt tgttgccaag   10980

gcttcaatat tcggcgcatg gattttcttt gtgcatgggt ctgagtgggg tgccgtaagg   11040

tatggtattg ctcccgattg ggagttctga cagatgatca tgccgccttc cgaagtagaa   11100

```
aaaagaggaa agggtcacat gctcatgatg atcgtttgct cgcgatgaat tgcgcttcct 11160

gcatatattt tgtttgcttg tcttagtcaa ccgataatgc aaattttggg gattgtgtat 11220

tgttggaaat tgaattacca actgcttaca ggacccaccc tgcgctcagg ccctcaacaa 11280

accttgggac aggattaccc actaagcctt tccaagcttt tccaaggctt ttggattcgt 11340

ttggtttgat agctcgtatg cgtatttcgc atctgtgtac ggagtatcgg attctgacag 11400

cctccattat acccgaaaac tacctggccg gcctgacctg tttcgtcttg ttcgacggtt 11460

tcccatcggc gttttgactc gggattatcg tgacgacaga caatgcctcc cgaaccggta 11520

cctctaaggt attgccccga gcatagcatg gtggtccggg gtttcccatg ggcacagagc 11580

gaatatcgtg tcacgtccaa gatgaaaaca aaccccgaac tatgaatcac gtgtcggggg 11640

cagcttatgc atctatagct atgccaggga cctgtagact gttggaagac tatcaacggt 11700

tttatcacca gggcgactga tatatcagtc aatgaaacaa cgttggaatg aacaataccc 11760

ccgccgtaac cgcaaccgca accgcaaccg caaccgcaac cgcaatggca ggctcggctt 11820

gctctaacac atccacgccc attgccatag ttggaatggg atgtcgattt gctggagatg 11880

caacgagtcc acagaagctt tgggaaatgg ttgaaagagg aggcagtgcc tggtctaagg 11940

tcccctcctc gcgattcaat gtgagaggag tataccaccc gaatggcgaa agggtcgggt 12000

ccgtgagtat ctaacatgca tgcatttata tcttgttttg aatatttgac acaagatttg 12060

agcatcactg aagcttggtt actgactcca aggatgactg gatagaccca cgtaaagggt 12120

ggacacttca tcgacgagga tcctgcttta tttgacgccg cgttcttcaa catgaccaca 12180
```

```
gaggtcgcca gcgtatgatt atttcaattg atctaacccg ggacgcagag atctaatatt   12240

ggacagtgca tggatccgca gtatcggctt atgcttgagg tggtctacga atcgctggag   12300

agtggtatgt agtgtgggtc atcctcactg taagcaaacg tcactgacca tcatccagcc   12360

ggtatcacca tcgatggtat ggcaggctct aatacgtcgg tgtttggggg tgtcatgtac   12420

cacgactatc aggattcgct caatcgtgac cccgagacag ttccgcgtta tttcataact   12480

ggcaactcag gaacaatgct ttcgaaccgg atatcacact tctacgactt acgtggtccc   12540

agcgtgacgg ttgacacggc ctgttcgacg acattgaccg cactgcactt ggcgtgccag   12600

agcttacgta ctggggagtc agatacagcc atcgttatcg gtgcaaatct tctgctcaat   12660

cccgatgttt ttgttacgat gtcaaacctg gggtgagttt tccgaagaag attccagatc   12720

gagagtcttg aactaagcaa tccttgttgc tcaatgacag atttttgtcc ccggatggta   12780

tctcgtactc ttttgatcct cgagcgaatg gatatggtcg cggggaagga attgccgctc   12840

tggtaataaa ggccctccct aacgcgttgc gagaccaaga ccctatccga gccgtcattc   12900

gagagacagc gctgaaccag gatggcaaaa cacccgcaat tactgcgccg agtgatgtgg   12960

cgcagaaaag tctgatccag gagtgttacg ataaggctgg gctagatatg tcgttgacct   13020

cgtacgtgga ggcccacgga actggaacac caactggtga cccccttgaa atctcagcaa   13080

tttcagcagc ttttaaagga catcctctgc accttggctc tgtgaaagca aatattggcc   13140

atacagaagc cgccagtggc ctggccagta taatcaaggt ggccttggcc ttggagaagg   13200

gcttgattcc ccctaatgcg cggttcctgc aaaagaacag caagctgatg cttgaccaaa   13260
```

```
agaacatcaa ggtaaggctt tgcgcattcg cagattcagt tatatgtttc aaaggttaat    13320

gtttcaaaga tccccatgtc tgctcaagac tggcctgtga aagatgggac tcgtcgcgca    13380

tctgtcaata acttcggctt tggtggttcg aatgctcacg tcattttgga atcatatgat    13440

cgcgcatcat tggccctgcc agaggatcaa gtgcatgtca atggtaactc tgagcatggt    13500

agggttgagg atggttccaa acagagccgc atatacgttg tgcgtgccaa ggacgagcaa    13560

gcttgtcggc gaacgatagc aagcctgcga gactacatta aatccgtcgc tgacattgac    13620

ggggaaccct tcctcgccag cctcgcctat acactaggct ctcgccgttc cattctgcca    13680

tggacgtcag tgtatgtagc agacagcctt ggcggccttg tttctgccct cagcgatgag    13740

tccaatcaac caaaacgagc gaatgagaaa gtacggctcg gatttgtatt caccggtcag    13800

ggggcgcagt ggcatgcaat gggcagagag ctggtcaata cattcccagt attcaaacag    13860

gcgattcttg aatgtgatgg ctacatcaag caactgggcg cgagttggaa ttttatgggt    13920

aagttgcgag cccgggaaaa gtaatactgt atcaagcttg aggtactaac attcaattgc    13980

acagaggagc tccaccgtga tgagctgacg actcgggtaa atgatgccga atacagtcta    14040

ccactgtcaa ccgctatcca aattgcactt gtgcgtctcc tttggtcatg gggaattcgg    14100

ccaacgggga taaccagtca ctcaagtgga gaggctgctg ctgcctacgc agctggggct    14160

ttatccgcgc ggtcggccat tgggatcact tatatacgcg gtgtattgac cactaagccc    14220

aagcccgcat tggcagccaa aggaggaatg atggcggtgg gtcttggtcg cagtgagacc    14280

aatgtttaca tttcgcgtct caaccaggag gacggctgtg tggtggttgg atgtatcaac    14340
```

agtcaatgta gtgtgacggt gtcgggagat ttgggtgcaa tcgagaaact tgaaaagttg 14400

ttacacgccg atggcatctt taccaggaaa ^tgaaagtca ctgaagcctt ccattcaagc 14460

cacatgcgac caatggcaga tgcctttggg gcgtcactga gagatctgtt caactcggat 14520

aacaacaacg acaatcccaa tgctgacacc tcaaagggtg tattatattc atcacctaag 14580

actggtagtc gcatgaccga tcttaaattg ctattggatc ccacacactg gatggatagt 14640

atgctacagc cggtagagtt cgagtcctca ctccgcgaga tgtgctttga tcccaacacc 14700

aaagagaaag ccgtcgatgt gattattgaa atagggcctc acggagcgct tggtggtcca 14760

atcaaccaag tcatgcagga tctgggtctg aaaggaacag atataaacta tctcagttgc 14820

ctttctcgcg gcagaagctc gttggagaca atgtatcgtg ctgctacgga gttgataagc 14880

aagggttatg ggctcaaaat ggacgctata aactttcctc atggaagaaa agagcccaga 14940

gtgaaggtac tgagcgattt gccggcgtac ccgtggaatc accaaacccg ttattggaga 15000

gagcctcgcg gcagtcgtga gtccaaacag agaacccatc cgcctcacac tttgataggc 15060

tcacgggaat ctctctctcc tcatttcgcg cctaaatgga aacatgttct ccgtctgtca 15120

gatattccat ggatacgaga tcacgtcgtt ggttcgagca tcatctttcc gggagctggc 15180

ttcatcagca tggccatcga ggggttttca caagtctgcc caccagttgc gggggctagc 15240

atcaactaca acttgcgtga cgttgaactc gcgcaggctc tcataatacc cgctgatgca 15300

gaagcagagg ttgacctgcg cctaacgatc cgttcatgtg aggaaaggtc cctcggcaca 15360

aagaactggc atcaattttc tgtgcactca atttcgggcg aaaataatac ctggacagaa 15420

```
cactgcaccg gattaatacg ttcggagagc gaaagaagcc accttgactg ttcaactgtg   15480

gaagcctcac gcaggttgaa tctaggctca gataaccgga gcattgatcc caacgatctc   15540

tgggagtcct tacacgcgaa tgggatatgc cacggaccca tttttcagaa cattcagcga   15600

attcaaaaca atggacaggg ctcgttttgc agattttcca ttgctgacac tgcctcggct   15660

atgcctcact cgtacgagaa tcgacacatc gtccatccta ctactctgga ctcggtgatc   15720

caggcggcat acacggtgtt accctacgcg ggaacacgta tgaaaacggc catggtacca   15780

aggaggctaa gaaatgtcaa aatatcctct agcctggctg acttggaggc tggtgatgct   15840

ctggacgcac aggccagcat caaggatcgc aactctcaat ccttctctac cgacttggca   15900

gtgtttgatg actatgatag cggttcttct ccctcggacg gaatcccagt catagagatt   15960

gaaggccttg ttttccagtc ggttggaagc agcttctctg accaaaagtc agactccaac   16020

gacacagaaa atgcctgcag ctcctgggtt tgggcccctg acatcagctt gggtgactcc   16080

acttggctca agaaaagtt gagcactgag gctgagacga aagaaacgga actcatgatg   16140

gacctccgaa gatgcacgat caactttata caggaggctg tcactgattt gacaaattct   16200

gatatccaac atctggatgg ccaccttcag aagtatttcg attggatgaa tgtccaattg   16260

gaccttgcga gacaaaacaa gctcagccca gccagttgcg actggctaag tgacgatgct   16320

gagcagaaga aatgcctaca ggccagagtc gctggagaaa gcgtcaatgg cgagatgatt   16380

tctcgtctag gacctcagtt aatagcaatg ctacgccgcg aaacagagcc acttgagttg   16440

atgatgcaag atcagctgct aagcagatac tacgtcaacg caatcaaatg gagccgatca   16500
```

aacgcacaag ccagcgagct gatccgactt tgcgcccaca agaacccgcg ttctcgcatt 16560

ttggagattg gcggaggcac gggcggctgc acaaagctta ttgtcaatgc attgggaaac 16620

accaagccga tcgatcgtta tgacttcacc gatgtgtctg ccgggttttt cgagtcggcg 16680

cgtgagcaat ttgcggattg gcaagacgtg atgactttca aaaaattgga tattgaaagc 16740

gatcccgagc aacaaggggtt tgaatgtgcc acctacgatg tggtcgtggc ttgccaggtc 16800

ctgcatgcaa ctcgatgcat gaaacgaaca ctgagtaacg ttcgaaaatt gctcaagcct 16860

gggggcaact tgattttggt tgagactacc agggatcagc tcgatttgtt ctttaccttc 16920

ggactgttgc caggttggtg gctcagtgag gagcctgagc ggaagtcgac gccatcgctc 16980

actaccgatc tttggaacac catgttggac acgagcggtt tcaacggtgt ggaattggag 17040

gttcgtgatt gtgaagacga tgagttttac atgatcagca caatgctatc gacggctaga 17100

aaagagaata caaccccgga tacagtggca gaatcggagg tgcttttgct gcacggagcg 17160

ctccgacctc cttcatcttg gctggaaagt ctccaggcag caatttgtga aaagaccagt 17220

tctagcccat cgatcaacgc tctgggcgag gtagatacca ctggaaggac atgcattttt 17280

cttggggaaa tggagtcctc gctccttgga gaggtgggaa gcgagacctt caaatccatc 17340

accgcgatgc tgaataactg caacgcactt ctctgggtgt ctagaggagc agccatgagc 17400

tccgaggatc catggaaagc tctacatatt ggtctgctgc gtaccatccg caacgaaaat 17460

aacgggaagg aatatgtatc gttggatctc gatccttctc gaaacgcata cacccacgag 17520

tccctgtatg ctatctgcaa tatcttcaat ggccgcctcg gcgacctttc cgaagacaag 17580

```
gagtttgaat ttgcagagag aaacggcgtc atccacgtac cgcgactttt caatgacccg    17640

cactggaagg accaagaagc ggttgaggtc acactgcagc cgttcgagca acccgggcgt    17700

cgtctgcgga tggaggttga gacgccaggg ctcttagact ccctgcaatt tcgagacgac    17760

gaaggacgtg aaggcaagga tcttccggat gattgggtag aaatcgaacc caaagctttc    17820

ggtctcaatt ttcgggatgt catggttgcc atgggtcaat tggaggccaa ccgtgtgatg    17880

ggcttcgaat gcgccggagt gatcacaaag ctcggtggag ctgctgccgc tagccaaggc    17940

ctcagattag gggaccgcgt atgtgcacta ctgaaaggcc attgggcgac cagaacacag    18000

acgccgtaca ctaatgtcgt ccgtattccg gacgaaatgg gcttcccaga agccgcttcg    18060

gtccccctgg ctttcactac cgcatatatt gcgctttata ccacggcaaa gctacgacga    18120

ggcgaaagag tcttgatcca cagtggagct ggaggcgtcg gtcaagcagc gatcattttg    18180

tcccagcttg cgggtgccga ggtcttcgtc acagcgggaa ctcaagccaa gcgtgacttt    18240

gtcggcgata aattcggcat caatccggat catatcttct cgagcaggaa tgacttattc    18300

gtcgacggca tcaaagccta cacgggcgga cttggcgttc atgtcgttct aaactcattg    18360

gcaggtcaac tcctccaagc aagctttgac tgcatggccg aattcggcag atttgttgag    18420

attggaaaaa aggacctgga gcaaaacagc agacttgaca tgctgccatt cacccgggac    18480

gtctctttca catcaattga tcttctctcg tggcaaagag ccaaaagtga agaagtatcc    18540

gaagcgttga accatgtcac aaaactcctc gagacaaaag cgattggctt gattggtcca    18600

atccagcagc actccttgtc aaacatcgag aaggccttcc gtacgatgca gagtggtcag    18660
```

```
catgttggca aagttgtggt caatgtatct ggggacgaac tggtcccagt cggcgatgga    18720

gggttctcgc tgaagctgaa gcctgacagt tcttacctag ttgctggtgg gctggggga    18780

attggaaagc agatctgtca gtggcttgtt gatcatggcg cgaagcactt gattatccta    18840

tcgagaagtg caaaggccag tccattcata accagcttgc aaaatcaaca gtgcgctgtc    18900

tatctacacg catgtgacat ctcagatcaa gatcaggtca ccaaggtgct ccggttgtgc    18960

gaagaagcac atgcaccgcc aattcgaggt atcatacaag gtgccatggt tctcaaggac    19020

gcgcttctat cgcgaatgac attggatgaa tttaatgcag caacacgccc aaaagtacag    19080

ggtagttggt atcttcacaa gatcgcacag gatgttgact tcttcgtgat gctctcatcc    19140

cttgttgggg tcatgggtgg ggcaggccag gccaattacg cagctgctgg tgcattccag    19200

gacgcacttg cgcaccaccg gagagcccat ggcatgccgg ctgtcaccat tgacttgggc    19260

atggtcaagt ctgttggata cgtggctgaa nctggccgtg gtgtggccga ccggctcgct    19320

agaataggtt acaagcctat gcatgaaaag gacgtcatgg atgtgttgga gaaggcaatc    19380

ctgtgttctt cccctcaatt tccatcacct cccgcagctg tggttacagg aatcaacaca    19440

tccccgggtg ctcactggac cgaggcaaac tggatacagg aacagcggtt tgtgggactt    19500

aaataccgcc aagtccttca tgcagaccaa tcctttgtct cttcgcataa aaaaggacca    19560

gatggcgtgc gggcccaact aagcagggtc acctctcacg acgaggccat ttctatcgtc    19620

ctcaaagcaa tgacggaaaa gctgatgcga atgtttggtc tggcagaaga cgacatgtcc    19680

tcgtccaaaa acctggcagg tgtcggcgta gactcactcg tcgccattga acttcgaaac    19740
```

tggatcacat ctgaaatcca tgttgatgtg tcgatctttg agctcatgaa tggtaacacc 19800

atcgccggcc tcgtcgagtt agttgtggcg aaatgcagtt aagttgaagg gttcagtgaa 19860

gccttttgtc tggccaagcg ggtatagctc gacggaggta tagtacgaag gagcatagcg 19920

gccatggtct gaagcctgaa tccaatctga atcgagcctg ggctgagcct gactatttaa 19980

tgcctgactt ctggatagca gtaaatagag atacctgaaa taccattaca gtggccctga 20040

gaagcaacaa agtacacatg tgcactcgtt ctcgaagtcg gaagagtgaa tgctttttat 20100

actaccaggg aagctgtctt agcacctcgg aggcttgact gtcaaaagtt ctctcttttt 20160

ctctccatta tgattcccgc aagccttgta aatgcgcgtt gaacggtcga aaggcgttgg 20220

cacgggcagt gggtacagat tgtggatatg tagtcggaag gcgggaggga gtacttgtgt 20280

ccacgtcgtt gcgccgtcct ctctttcgcc tagtcgggga tgttgagtag gaacatcaag 20340

acttaacaga gcctaagccc tcgtcatcgt aagcgccagt caacgcctga gagaatgggg 20400

agatcggtga ttgtaccggg agaaaagctt cattactgcc gacttcccta cgtggcggtg 20460

tagctggcgg tatagaagca gatggccgct ctgcgtagca ggaatacaca ctctctccct 20520

tctctctctc tgtgtttctg tctctcgcac atagccaaag tctacaccac gttcgattac 20580

aaagaaggca tcacaatcga ataaaatgcg ttttatttta ctaacctact cgactaatac 20640

agcacctagt ttctctggga cggaaactat tggaataagc ctggggacgg atgcatattt 20700

gttttagttt gcgtgttata tcttagcacc ggtcatgagg gagcgggatg tcctcgttgc 20760

gccggcgtac catgagcttt gtggttggat gcatacgaac gctaaaagcg tgacggtagt 20820

```
atttgtcatc gtctcctggt acaggcttca catcatactg aatcagtata tgagcgagga    20880

gaatcttgat ttccttcgag gcgaagaacc gcccgggaca agcgcgtggg ttccagccga    20940

agccgatgtg atcaccgttg gtattctcca attgagcggt gaaggccttg tctggatcct    21000

cgcgcatgcg cataaatcgg tagggatcat aattttcggg gttttcccac acatcagggt    21060

tgttcatgcg gtctgcagcc acagcggcca actcgccctt gggaatgaag aggccattgg    21120

atagagtgat gtctctgaga gcggtactgc gcatagtggc gcactcgacc ggcttgattc    21180

gctgcgtctc tttcatgcag ctgtcgagga gcttcagctt gaacagagag gcaggcgtcc    21240

agccccccttc tccgattaca gtgcggatct cttggcggag aggctgaata aggtctgggt    21300

gcctggcaat gtccacaagg gcaccgacga aaagatccgt cgaggcgtag atgccggcga    21360

aatccatagc gagctgagca cccgccacat cgtaccagcg gccgtcggcg gtgtcttcaa    21420

accattgcat ggtatcgacg tactggggcg gctgcacgcc cttcgctaca catgcggcct    21480

tttcagcacg tcgtcgctga atctcaggat caatgatctt tcgtgcgcgg cgcacttggt    21540

cacgcaattt gcgtccttgc ggttgaaacc agtgagcgag cggtcgcagt agcatgggcc    21600

atacgcgaag ttggcgagct tgtaccgcca cactcacggc atggttcttt gcaatatcca    21660

gccactcctc attgtggcag attttgtcgc cgaccataat gagtgtgact gttcgtgtga    21720

caaggtccaa tccattggaa tagacaggtg cggtttgcca ctctagtata ttcgcggtat    21780

gtcagccaga ggctcaatgc tcaagacaga aaaattgaca cttaccctcg cttttaccga    21840

acaacttggc aatagtagcg tcggccaagg tagccaatgg ctttgtgtac ttggggggctt    21900
```

```
gggtttgtaa ctggttcaaa acaactttgt tgacaagatg tgcatcctgg cagatttcct    21960

tgaacccgtc gaatccaggg agatgagagt gaaagtccta tacattcatc agaatcttag    22020

agacgtcatt gagttacaac aatggaaaat tcagaggtca tacatccgcc aaaaacttgt    22080

acatgcacat atctttgatt ttccgaaact cgtcggccat ggacgatggg aggatggtgc    22140

aatagccgga atcaacaatg aagcgcaggg gcttgtcgtt tttcgagaac caagcttcga    22200

tccagctcgg accatacgta tcgaagtcct gcctagccct catggtcgtc aactcccacc    22260

attttttggg attatagact tgcagttcgg actggcgccc ccgcaaacgg taggcgatga    22320

gactaagaag cactgcgacc gccacaaggg cttgaggggt cgatacccat tggtacgatt    22380

cgacggtcag aagaacctgg ccgagcattg cgtgagacag ataggaccta tgcacaccag    22440

tggaaaagaa gaaagagcga agaatgagag cgctgcgacg gtttataatc gaataacagc    22500

actaatgctt ctgggatttt gtggccgaga gcactcttcc agtcaacctt gaaaaaaaaa    22560

aaacccccccc cccaatcgaa gtttacctgg atggggcagt tcggttgttt cctttaggag    22620

cagcttcacc gagcagcaca agaacaatcc gagtgaaaaa ctcggtttca ccttgataca    22680

gccaattgat attcacgttt gattcattca gcctcgtgtg accgaataac gccgtatgga    22740

ggaatggcta ttcgtgcacc gaatgacgcc gggagggttt gctaggtgcc gagcttgcat    22800

tgctgggaag tgggggcatt tgagtactag aatggatctt gaaattgtcc gaatctagat    22860

gagtactgat acgtgcaagt aaatataacg acggtatcgg ttgcaaggcc ggcttgttcg    22920

ctcagagatt caactctgcg attctgtaag aacaaatgtt gtgcccggca tgcagtgaga    22980
```

agatctactg acgcaagaca aggtttaatc ccaatcctat cgcccaaaaa caggatcagc 23040

agttatggat caagccaact atccaaacga gccaattgtg gtagtgggaa gcggttgtcg 23100

gtttccaggt ggtgtcaaca caccatcaaa actttgggag ctgctcaaag agccccggga 23160

tgtacagacc aagatcccta aggagagatt tgacgtcgat acattttaca gccccgatgg 23220

cactcacccc gggcgcacga acgcaccctt tgcatacttg ctgcaggagg atctacgcgg 23280

ttttgatgcc tctttcttca acatccaagc tggagaggcc gaaacgattg acccacagca 23340

aaggctgctg ctggagacgg tctatgaagc tgtatccaac gcaggcctac ggatccaagg 23400

ccttcaagga tcctctactg ctgtgtacgt cggtatgatg acgcatgact atgagactat 23460

cgtgacgcgt gaattggata gtattcctac atactctgcc acgggggtag ctgtcagtgt 23520

ggcctccaac cgtgtatcat acttcttcga ctggcatggg ccgagtgtga gtgccactca 23580

ttgagcgagc ccgacttcgt caagtgctga cagattcctg actgattctg cagatgacga 23640

tcgacacagc ctgtagttca tccttagctg ccgtgcatct ggccgtccaa cagcttagaa 23700

cgggcgagag taccatggcg gttgcagccg gtgcgaatct gatattgggc cccatgacct 23760

ttgtaatgga gagcaaattg aacatgctgt cccccaatgg tagatctcga atgtgggatg 23820

ctgctgccga tggatatgcc agaggagtaa gttgacaatg catcaattcc tttcaaaaaa 23880

agcaagatgg cactgacctc ctgtaactgc ttttttaggaa ggtgtttgct ctattgtcct 23940

gaaaacgctg agccaggcac tgcgcgacgg ggacagtatc gagtgtgtta tccgagagac 24000

cggtatcaac caagatggcc gaacgacagg tatcacaatg ccaaaccata gcgcacaaga 24060

agccctcatt cggggccacat atgccaaggc tggtcttgat attaccaacc cccaggaacg 24120

ctgccagttc tttgaagccc atggtaagtg gtattccctg gaagtatcag ccttatggaa 24180

gttgcagaaa gtctctctct ccctaacacg aagatcccag gaactggtac accagccggt 24240

gacccacagg aagctgaggc tattgcaaca gccttcttcg gacacaagga tggaacaatc 24300

gacagcgacg gcgagaaaga tgagcttttt gtcggcagca tcaagacagt tctcggtcac 24360

acggaaggca ctgctggtat tgcgggctta atgaaggcat cgtttgctgt acgaaatggc 24420

gtgatcccgc caaacctgct gtttgagaag atcagtcccc gtgtcgctcc gttctatacg 24480

cacttgaaaa ttgcaacgga ggccacagaa tggccgattg ttgcgcccgg gcagcctcgc 24540

agagtcagcg ttaattcatt tggtaaggat tcaactgcac ttcttgagaa cgaaagtgaa 24600

gttagctaaa catataaaca catcaggatt tggtggtaca aatgcccatg ctattatcga 24660

agagtatatg gctcctccac acaagccgac agcagtggta acagaggtga cctcagatgc 24720

agatgcatgc agcttgcccc ttgtgctttc atcgaagtcg cagcgctcca tgaaggcaac 24780

gctagaaaat atgctccaat ttctggaaac gcatgatgac gtggacatgc atgatatcgc 24840

atatacctta cttgagaaac ggtctatctt gcccttccgt cgtgcgattg cagcacacaa 24900

caaggaagta gcccgcgcgg cactggaggc tgccatcgcg gacggtgagg tcgtcaccga 24960

cttccgcacc gacgcgaatg acaaccctcg cgtactaggt gtctttactg gccaaggtgc 25020

acagtggccg ggcatgctga agaagctcat ggtgggtatg ccatttgtga gaggcattct 25080

cgaagagctg gataattcac tgcaaacact gcctgaaaag tatcggccta cgtggacact 25140

gtatgaccag ctcatgcttg aaggggatgc ctcaaacgtc agactcgcca gcttctccca 25200

gcctctatgc tgcgccgtac aaatcgttct ggtccgactt ctcgctgcag ctggtatcga 25260

gttcagtgca attgtcggcc acagttcagg tgagattgcc tgtgcctttg cggcaggatt 25320

catcagtgcc actcaagcta tccgtattgc gcatctgcgt ggagttgtgt ccgcggagca 25380

tgcctcttct ccaagcggcc agacaggcgc tatgctagcg gcaggtatgt cgtacgatga 25440

cgcaaaggaa ctatgcgagc tcgaagcctt tgagggtcgg gtctgcgtcg ccgctagcaa 25500

ttcaccggat agtgtgacct tctccggcga catggatgct atccagcacg ttgaaggtgt 25560

cttggaggat gaatccactt ttgccagaat cttgagagtt gacaaggcct accattcgca 25620

tcacatgcac ccatgcgcag ctccatatgt caaggcattg ctggagtgcg actgtgctgt 25680

tgccgatggc caaggtaacg atagtgttgc ttggttctct gccgtccacg agaccagcaa 25740

gcaaatgact gtacaggatg tgatgcccgc ttattggaaa gacaatctcg tctctccggt 25800

cttgttctcg caggctgtgc agaaagcagt catcactcat cgtctaatcg acgtcgccat 25860

cgaaattggc gcccaccctg ctctcaaggg tccgtgtcta gccaccatca aggatgctct 25920

tgccggtgtg gagctgccgt ataccgggtg cttggcacga aacgttgacg atgtggacgc 25980

ttttgctgga ggtctgggat acatttggga gcgtttcgga gttcggagta tcgacgccga 26040

gggcttcgta caacaagtcc ggcccgatcg tgccgttcaa aacctgtcaa agtcattgcc 26100

cacatactct tgggatcata ctcgtcaata ctgggcagaa tctcgctcca cccgccagca 26160

tcttcgtgga ggtgcgcccc atcttctgct tggaaagctt tcttcttaca gcacagcatc 26220

```
gaccttccag tggacaaact tcatcaggcc :cgggatctg gaatggctcg acggtcatgc   26280

gctacaaggc cagactgtgt tccccgctgc tgggtacata attatggcca tggaagctgc   26340

catgaaggtg gctggtgagc gtgccgccca agttcagctc ctggaaatct tggacatgag   26400

catcaacaaa gccatcgtgt ttgaagatga aaacacctcc gtggagctga acttgacagc   26460

cgaagtcacc agtgacaatg atgcggatgg ccaagtcacg gtcaaatttg ttattgattc   26520

ctgtctggca aaggagagtg agctttcgac atccgccaaa ggccaaatcg tcataaccct   26580

tggcgaggca tcaccgtcat cgcagctttt gccgccacct gaggaagagt accccagat   26640

gaacaatgtc aacatcgatt tcttctatcg ggaacttgac ctccttgggt atgactacag   26700

caaagacttc cgtcgtttgc agaccatgag aagggccgac tccaaagcta gcggcacctt   26760

ggctttcctt ccacttaagg atgaattgcg caatgagccc ctcttgctcc acccagcgcc   26820

cctggacatc gcgttccaga ctgtcattgg agcgtattcc tctccaggag atcgtcgcct   26880

acgctcattg tacgtgccta ctcacgttga cagagtgact ctgattccat cgctctgtat   26940

atcggcgggt aattctggtg aaaccgagct tgcgtttgac acaatcaaca cacacgacaa   27000

gggtgatttc ctgagcggcg acatcacggt gtacgattcg accaagacaa cgctttttcca   27060

agttgataac attgtcttta agcctttctc tcccccgact gcttcgaccg accaccgaat   27120

cttcgcaaag tgggtctggg gacccctcac gcccgaaaaa ctgctggagg accctgcgac   27180

gttgatcata gctcgggaca aggaggacat tctgaccatc gagcgaatcg tttacttcta   27240

catcaaatcc ttcctagccc agataacccc cgacgaccgt caaaatgccg acctccattc   27300
```

```
ccagaagtac attgaatggt gtgaccaggt tcaggccgat gctcgggctg gccaccatca   27360

gtggtaccag gagtcttggg aggaggacac ttctgttcac attgagcaaa tgtgtgaaag   27420

gtacacccaa agctgttccg tgttttttca ttcttttata ttaacctttt acttgaagca   27480

actcgtccca cccacatgtg cgcctgatcc aaagggtagg caaagaatta atttcaattg   27540

ttcgcgggaa cggggatcct ttggatatca tgaaccgcga tgggttgttc accgagtact   27600

ataccaacaa gctcgccttt ggctcagcaa tacacgtcgt tcaggatctg gttagccaaa   27660

ttgctcatcg ctaccaatcc attgatatcc ttgagatcgg taagtcgaat ctgaaatgta   27720

agtaactagg cagtttgcta atctgtcgtt cgctttttag gcttgggtac aggcatcgcc   27780

acgaagcgcg ttcttgcatc acctcaactt ggtttcaaca gttacacttg cactgacatc   27840

tcggcggatg ttattggcaa ggcccgtgaa caactttccg aattcgacgg tctcatgcag   27900

tttgaggcac tagacatcaa cagaagccca gcagagcaag gattcaagcc tcactcctac   27960

gatctgatta ttgcatccga tgtcctccat gccagctcca acttcgagga aaaattggct   28020

cacataaggt ccttgctcaa gccgggtggt cacttggtta ctttcggggt cacccatcgc   28080

gagcctgctc gcctcgcctt catctctggg cttttcgctg atcgatggac tggagaagac   28140

gaaactcgtg ctttgagtgc ctcggggtcc gttgaccaat gggagcatac cctcaagaga   28200

gttgggttct ctggcgtcga tagtcggaca cttgatcgag aggatgattt gatcccgtct   28260

gtcttcagta cacatgctgt ggatgccacc gttgagcgtt tgtatgatcc actttctgct   28320

ccattgaagg actcataccc gccattagtg gttatcggtg gcgaatcgac aaaaaccgaa   28380
```

```
cgcattttga acgacatgaa agctgcccta ccgcatagac acatccactc cgtcaagcgg    28440

ctggaaagtg ttctcgacga cccggccttg cagcctaagt cgacttttgt catcctctcg    28500

gaacttgatg atgaagtgtt ttgcaacctt gaagaggaca agtttgaggc agtcaagtct    28560

cttctcttct acgccggacg catgatgtgg ctgacagaga atgcctggat tgatcatccc    28620

caccaggcca gcaccatcgg aatgttgagg acaatcaagc tcgagaaccc tgacttggga    28680

acgcacgtct tcgatgtcga tactgtggag aacctagaca ccaaattctt cgttgagcaa    28740

cttttgcgct tcgaggagag cgatgatcag cttttggaat caataacatg gactcatgag    28800

cccgaagtgt actggtgcaa gggtcgtgcc tgggtccctc gtttgaagca ggatattgct    28860

aggaacgacc gtatgaactc gtctcgtcgt ccaattttcg gtaactttaa ttcgtccaag    28920

acggccattg cactgaaaga ggcgagggga gcatcctcat cgatgtacta tcttgagtca    28980

accgagacgt gtgattcgtt agaagacgct cgtcatgctg gaaaagcaac tgttcgtgtt    29040

cgctacgctc ttccccaggc aattcgcgtg ggccatctcg gatacttcca tgtcgtgcag    29100

ggcagtattc tggagaatac atgtgaggtg cctgtagtcg ccctggctga gaagaatgga    29160

tctatactgc atgtaccgag aaactacatg catagtctgc ccgataacat ggcggaaggc    29220

gaggatagtt ccttcttgtt gtccacagct gcagccctcc ttgccgaaac aattctctct    29280

agcgctcagt cctttggctc tgatgcatca attctgatta tggagccccc aatcttctgc    29340

gtcaaagcaa ttctggagtc ggccaaaacc tacggtgttc aggttcattt ggcaacaact    29400

ctgtccgacg tcaaaactat tccggctcct tggatccgat tacatgccaa ggaaaccgac    29460
```

```
gctcggctga aacacagcct gccgacaaac atgatggcat tctttgactt gtctaccgac    29520

cggactgctg ccgggataac caaccgtttg gccaagttgc taccacccag ttgcttcatg    29580

tacagtggtg actatcttat ccgaagtaca gcttccacat acaaagttag tcatgttgag    29640

gatattccaa tcctcgagca ctctgtggca atggcaaaaa ataccgtctc tgcgtcgact    29700

gtcgacgaca ctgagaaagt tattacagcc acacaaattc tcttgcctgg tcagctctct    29760

gtcaaccaca atgaccaacg cttcaatctg gccaccgtca tcgactggaa ggaaaatgag    29820

gtgtccgcta ggatttgccc catcgactct ggtaacttat tttccaacaa gaagacgtat    29880

ttgcttgttg gtcttaccgg ggaccttggt cgctctctct gtcgctggat gatcttgcat    29940

ggcgcccgcc atgttgtgct cactagccgg aaccctcgac ttgatcccaa atggatcgcc    30000

aacatggagg cacttggtgg tgacatcacc gttctgtcaa tgtaagttga ttgatatcac    30060

atcacacctt gctaccacat cctcgtttac ttatccaatt actttcttta gggatgttgc    30120

caatgaggat tcagtcgatg ctggccttgg caagcttgtc gatatgaagt tgccacctgt    30180

tgccggcatc gcgttcgggc ctttggtgct gcaggatgtc atgctgaaga acatggacca    30240

ccagatgatg gacatggtgt tgaagcccaa ggtacaagga gcacgcattc ttcatgaacg    30300

gttctccgaa cagacgggca gcaaggcgct cgacttcttc atcatgtttt cgtccattgt    30360

tgcagttatt ggcaatcctg gccagtccaa ctatggcgct gcgaatgcct acctacaggc    30420

tctggcccag caacggtgcg ccagaggatt ggcggtattt tctacccctg aattatcatg    30480

catcgacgtc aagttactaa cgcacaacca aagggatcaa ccatcgatat tggtgccgtt    30540
```

```
tacggtgtag ggtttgtcac gagggccgag atggaggagg actttgatgc tatccgtttc   30600

atgtttgact cagttgaaga gcatgagctg cacacgcttt tcgccgaagc ggtcgtgtct   30660

gaccagcgtg cccggcagca accacagcgc aagacggtca ttgacatggc ggaccttgag   30720

cttaccacgg gtatcccaga tcttgaccct gcgcttcaag atcgaattat ttacttcaac   30780

gaccctcgtt tcggaaactt caaaattccc ggtcaacgcg gagacggtgg cgacaatgga   30840

tcagggtcta aaggctccat tgccgaccag ctcaaacaag caacaacttt agaccaagtt   30900

cggcaaatcg tgattggtaa gttatctctc atgcgtttcc tgatatcgag ttcaaactaa   30960

caaagttgca gatggtctat ctgagaaact ccgtgttacc ctccaagttt cggacgggga   31020

gagcgtggac ccaaccattc ctctcattga tcaaggtgtc gactccttgg gtgcagtgac   31080

tgtcggctca tggttctcaa agcaactcta ccttgacctc ccactcttga gggtacttgg   31140

cggtgcttct gtcgctgatc ttgccgacga cgcggccacc cgactcccag ctacatccat   31200

tccgctgctg ttgcaaattg gtgattccac gggaacctcg gacagcgggg cttctccgac   31260

accaacagac agccatgatg aagcaagctc tgctaccagc acagatgcgt cgtcagccga   31320

agaggatgaa gagcaagagg acgataatga gcagggaggc cgtaagattc ttcgtcgcga   31380

gaggttgtcc cttggccagg agtattcctg gaggcagcaa caaatggtaa aagatcatac   31440

catcttcaac aacactattg gcatgttcat gaagggtacc attgacctcg accggttgag   31500

gcgggctctg aaagcctcat tgcgccgtca cgagatcttc cgtacgtgct ttgttactgg   31560

cgatgactat agcagcgatt taaatggtcc cgtccaagtg gttctcaaga acccggagaa   31620
```

cagagtgcac tttgttcagg tgaacaacgc tgcggaggca gaggaagagt accggaaact 31680

cgagaagaca aactatagca tctccacagg tgacactctc agactcgttg atttctactg 31740

gggcacagat gaccacctgt tggtaatcgg ctaccacaga ttagttggtg atggctcaac 31800

aacagaaaac ctgttcaatg agatcgggca gatttacagc ggggtgaaaa tgcagcgacc 31860

atcgacccaa ttctctgatc tagccgtcca acagcgggaa aacctggaaa atgggcgaat 31920

gggggacgat atcgcgttct ggaagtccat gcatagcaaa gtctcgtcat ctgcgccaac 31980

cgtgcttccc atcatgaatc tgatcaatga ccctgctgcc aattcagagc agcagcaaat 32040

acagccattc acgtggcagc agtatgaagc aattgctcgt ttagatccca tggtcgcctt 32100

ccgaatcaaa gagcggagcc gcaagcacaa ggcaaccccc atgcagttct acctggccgc 32160

ctaccacgtt ttgttggcgc gtcttaccgg cagcaaagac ataaccatcg gcctcgccga 32220

aaccaaccga tccaccatgg aagaaatttc ggcgatgggc tttttcgcta acgtgcttcc 32280

cctgcgcttt gatgagttcg tcggcagcaa gacattcggc gagcaccttg tagccaccaa 32340

ggacagtgtg cgtgaggcca tgcaacacgc gcgggtgccg tatggcgtca tcctcgactg 32400

tctaggcctg aatctcccta cctcaggcga ggaacccaag actcagacac acgccccctt 32460

gttccaggct gtctttgatt acaagcaggg tcaagcggag agtggctcaa ttggcaatgc 32520

caaaatgacg agtgttctcg cttcccgtga gcgcactcct tatgacatcg ttctcgagat 32580

gtgggatgac cctaccaagg acccactcat tcatgtcaaa cttcagagct cgctgtatgg 32640

ccctgagcac gctcaggcct ttgtagacca cttttcttca atcctcacta tgttctcgat 32700

gaacccggct ctgaagttgg cctagatcgt tcagcgccgt gaattcagat gtgtggtttg   32760

agtgttgttc atgataaaga tggattagaa attggcaata gagcagatgg caaatctatc   32820

ctgaattcgg cgtcaattga cacacgcata ttcatctaca aatagcgaat tcgtcttgta   32880

tctttgtcaa aattacttct accttcgttg ctcttcttta ttgcagcaat cgtaacatca   32940

agttagatag cgcggttcag agtaccgtaa cggtgataaa tatacctcgg tagcgcgttt   33000

cgaaagactc tgtgaggaag gtgaaacctc caaggcttgg aattgatttc aatccatcct   33060

gtatataaat tcgacgccat tgcaaatagt tccatagtta ctggtttagt gccttgttgt   33120

ggtgatcgag tggtttttaga tgtctgtcat gcctgttcag aacgagcctt ccatgatcta   33180

tccaaaatat gttcacgaaa tatttatgag atggtcgcga ccactataac taaatcaccc   33240

ttggaaggtg agcattcaaa ccgtgtaaga ttagaactat tcaaatttgt tcagtaaaaa   33300

tgtggtatgg actaggcatg agagccagag ccttgctata taccctgttg tctcacctag   33360

acaaatgaac ctgacatctt gaccttttga tatagctgtt ggaagcgctt gaccgtctcc   33420

tggacatcac tcggtctgtt gggaaaatta tgctttccct gaaactcgag tacatctgca   33480

ttctgaggca ggtaatgtgt ttcaaccatc tgtctcgacc cttggagagc aaaatcttga   33540

cgaccgtgaa gatgcagtgt cggcacgttg attattagct tgtcgtcgtc gtcttgcgcc   33600

tcggctctca tgtaatctct ggcttcatcg ctatagaaac agcaaatcaa aacagcaatg   33660

ctcattttcg gaaaccatgg cagttttccc atttgctgtt gatggagcag caaagtggcg   33720

accaatgcgc cctcagagaa ggccactatg ccgacaatgg gtgcctgtgg gttagttata   33780

gaccaatctt ggacggtctt ttgcacaggc ccgatcacag ccgctactct atcgcccacc 33840

gtgggggttg tcgtgtttgt aacggcgtca tgatgctttt ggaaccaggt gtagtatgga 33900

cccatgcctt ggaagacagg aagcacgccg ggtccggggc tggagctaaa cggcgcggtc 33960

gcatatacga attcaaactc gtttttcaac gccacgcgca gtttagagat ctggacgcgg 34020

aatatggctg ctgagcaccc ggcaccgtgg atgcataaga gagcttttct cggtttgcct 34080

ggcgagaaat ctgtaatcct cgctggactc attttctctt gtggtgtgag ctgtgacttc 34140

gtctgttctg gggaatttgt tagtcattac tgacaaggaa ataacaacga cgtagtattg 34200

atc   34203

<210> 3
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<221> misc_feature
<223> Description of Artificial Sequence: A mixed primer
      which has a DNA sequence decuced from the amino
      acid sequence of PKS of Aspergillus flavus.

<220>
<221> modified_base
<222> (6)..(6)
<223> i

<220>

<221> modified_base

<222> (9)..(9)

<223> i

<400> 3

gayacngcnt gyasttc   17

<210> 4

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: A mixed primer
      which has a DNA sequence deduced from the amino
      acid sequence of PKS of Aspergillus flavus.

<220>

<221> modified_base

<222> (3)..(3)

<223> i

<220>

<221> modified_base

<222> (6)..(6)

<223> i

<220>

<221> modified_base

<222> (8)..(8)

<223> i

<220>
<221> modified_base
<222> (15)..(15)
<223> i

<400> 4
tcnccnknrc wgtgncc   17

<210> 5
<211> 19
<212> DNA
<213> Penicillium citrinum

<400> 5
gcatgttcaa tttgctctc   19

<210> 6
<211> 19
<212> DNA
<213> Penicillium citrinum

<400> 6
ctggatcaga cttttctgc   19

<210> 7
<211> 18
<212> DNA
<213> Penicillium citrinum

<400> 7

gtcgcagtag catgggcc   18

<210> 8
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 8

gtcagagtga tgctcttctc   20

<210> 9
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 9

gttgagagga ttgtgagggc   20

<210> 10
<211> 19
<212> DNA
<213> Penicillium citrinum

<400> 10

ttgcttgtgt tggattgtc   19

<210> 11
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 11
catggtactc tcgcccgttc   20

<210> 12
<211> 19
<212> DNA
<213> Penicillium citrinum

<400> 12
ctccccagta cgtaagctc   19

<210> 13
<211> 21
<212> DNA
<213> Penicillium citrinum

<400> 13
ccataatgag tgtgactgtt c   21

<210> 14
<211> 19
<212> DNA
<213> Penicillium citrinum

<400> 14
gaacatctgc atccccgtc   19

<210> 15
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 15

ggaaggcaaa gaaagtgtac   20

<210> 16
<211> 21
<212> DNA
<213> Penicillium citrinum

<400> 16

agattcattg ctgttggcat c   21

<210> 17
<211> 722
<212> DNA
<213> Penicillium citrinum

<400> 17

ggccacgcgt cgactagtac gggggggggg gggggggggg gcttgttcgc tcagagattc   60

aactctgcga ttctgtttaa tcccaatcct atcgcccaaa aacaggatca gcagttatgg   120

atcaagccaa ctatccaaac gagccaattg tggtagtggg aagcggttgt cggtttccag   180

gtggtgtcaa cacaccatca aaactttggg agctgctcaa agagccccgg gatgtacaga   240

ccaagatccc taaggagaga tttgacgtcg atacatttta cagccccgat ggcactcacc   300

ccgggcgcac gaacgcaccc tttgcatact tgctgcagga ggatctacgc ggttttgatg   360

cctctttctt caacatccaa gctggagagg ccgaaacgat tgacccacag caaaggctgc   420

tgctggagac ggtctatgaa gctgtatcca acgcaggcct acggatccaa ggccttcaag   480

gatcctctac tgctgtgtac gtcggtatga tgacgcatga ctatgagact atcgtgacgc   540

gtgaattgga tagtattcct acatactctg ccacggggggt agctgtcagt gtggcctcca   600

accgtgtatc atacttcttc gactggcatg ggccgagtat gacgatcgac acagcctgta   660

gttcatcctt agctgccgtg catctggccg tccaacagct tagaacgggc gagagtacca   720

tg   722

<210> 18
<211> 760
<212> DNA
<213> Penicillium citrinum

<400> 18
ggccacgcgt cgactagtac ggggggggggg ggggggggggg gactatcaac ggttttatca   60

ccagggcgac tgatatatca gtcaatgaaa caacgttgga atgaacaata cccccgccgt   120

aaccgcaacc gcaaccgcaa ccgcaaccgc aaccgcaatg gcaggctcgg cttgctctaa   180

cacatccacg cccattgcca tagttggaat gggatgtcga tttgctggag atgcaacgag   240

tccacagaag ctttgggaaa tggttgaaag aggaggcagt gcctggtcta aggtcccctc   300

ctcgcgattc aatgtgagag gagtatacca cccgaatggc gaaagggtcg ggtccaccca   360

cgtaaagggt ggacacttca tcgacgagga tcctgcttta tttgacgccg cgttcttcaa   420

catgaccaca gaggtcgcca gctgcatgga tccgcagtat cggcttatgc ttgaggtggt   480

ctacgaatcg ctggagagtg ccggtatcac catcgatggt atggcaggct ctaatacgtc   540

ggtgtttggg ggtgtcatgt accacgacta tcaggattcg ctcaatcgtg accccgagac   600

```
agttccgcgt tatttcataa ctggcaactc aggaacaatg ctttcgaacc ggatatcaca        660

cttctacgac ttacgtggtc ccagcgtgac ggttgacacg gcctgttcga cgacattgac        720

cgcactgcac ttggcgtgcc agagcttacg tactggggag                              760


<210>   19
<211>   773
<212>   DNA
<213>   Penicillium citrinum

<400>   19
ggccacgcgt cgactagtac ggggggggggg ggttttttttt ttttcaaggt tgactggaag       60

agtgctctcg gccacaaaat cccagaagca ttagtgctgt tattcgatta taaaccgtcg        120

cagcgctctc attcttcgct ctttcttctt ttccactggt gtgcataggt cctatctgtc       180

tcacgcaatg ctcggccagg ttcttctgac cgtcgaatcg taccaatggg tatcgacccc        240

tcaagccctt gtggcggtcg cagtgcttct tagtctcatc gcctaccgtt tgcgggggcg       300

ccagtccgaa ctgcaagtct ataatcccaa aaaatggtgg gagttgacga ccatgagggc       360

taggcaggac ttcgatacgt atggtccgag ctggatcgaa gcttggttct cgaaaaacga       420

caagcccctg cgcttcattg ttgattccgg ctattgcacc atcctcccat cgtccatggc       480

cgacgagttt cggaaaatca aagatatgtg catgtacaag tttttggcgg atgactttca       540

ctctcatctc cctggattcg acgggttcaa ggaaatctgc caggatgcac atcttgtcaa       600

caaagttgtt ttgaaccagt tacaaaccca agcccccaag tacacaaagc cattggctac       660

cttggccgac gctactattg ccaagttgtt cggtaaaagc gaggagtggc aaaccgcacc       720
```

tgtctattcc aatggattgg accttgtcac acgaacagtc acactcatta tgg   773

<210> 20
<211> 527
<212> DNA
<213> Penicillium citrinum

<400> 20
ggccacgcgt cgactagtac gggggggggg gtacctagga actgttcagt tgtccctccc   60

aacccctttgg gccgaacaac cttcctccaa tctacgacgg cagattatac ctaggcgcct   120

aaccgattag gttgctcatt cgattttgga gagactacct agctataggt accactccaa   180

gctgtagcac agacctttca gcatggtcgc ttcgttgcta ccctctcgct ttcgcggtag   240

ggaatcaatg aatcagcagc accctctacg ctcgggaaat cgggcattga cctccacact   300

ccaatttcta tccaaaacgg cgtgtctaca cccgatccat accgtttgca ccatagctat   360

tctagctagt accacatacg ttggactact caaagacagc ttcttccatg gccccgcaaa   420

cgttgataaa gcagaatggg gctctttggt cgaaggaagt cgaagcttga tcaccggccc   480

acagaatggc tggaagtggc agagcttcga cggggatgca gatgttc   527

<210> 21
<211> 522
<212> DNA
<213> Penicillium citrinum

<400> 21
ggccacgcgt cgactagtac gggggggggg gggggggggg ggatccatca atctgacttc   60

aggctagcgg accttaacga acaacgaga gcgagatcat tcatacacca aaacacaggt   120

actatagaag cgccgcgcag tagagattca caccgcccct tgaagcaaaa gtcggaagga   180

attgcgcgat gtcagaacct ctacccccta aagaaggggga accaaggcca cagaaggaag   240

aaagtcaaaa tgacacgctc gaagcgactg agtccaagtc ccagcacatc acaggcctca   300

agctcgggct ggtggttgct tcagttactt tcgtagcatt tttgatgctc cttgatatgt   360

ccattatcgt cacggcaatc ccacatatca caagcgagtt ccactctctg aacgatgtag   420

ggtggtacgg cagtgcttat cttctggcta actgtgctct ccagcccctg gccggtaaat   480

tgtatacact cttgggcttg aagtacactt tctttgcctt cc   522

<210> 22
<211> 541
<212> DNA
<213> Penicillium citrinum

<400> 22
ggccacgcgt cgactagtac gggggggggg ggctcacctc acattatttg atcttaatcc   60

aataattatg tccctgccgc atgcaacgat tccgacgaac ctacgccgtc gcgcgtttcg   120

acgctcatgt gaccggtgtc atgcacaaaa gctcaaatgt accggtagca atgccaattt   180

agtccgtgct cagtgtcaac gttgtcagca agccggatta aggtgtgtgt acagcgaaag   240

gctacccaag cgcaatttac ataaagaagc cgcagctgga actacaagag ccacagaaac   300

ctcacaaccg atgaccgcga catcttctac ggtcttctca tcattggcag agactcctcc   360

accttactgc tcaccaccta cgcatattgg cacctcggca ctcaaggaaa cattatcaga   420

accatcagcg gcaaccctgc aattctatga tacatcaatc aactttgatg atcccgagtc   480

gtttcccggc ggctggcctc agccaaatac atttcgcgac gatgccaaca gcaatgaatc   540

t   541

<210> 23
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 23
atcataccat cttcaacaac   20

<210> 24
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 24
gctagaatag gttacaagcc   20

<210> 25
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 25
acattgccag gcacccagac   20

<210> 26
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 26
caacgcccaa gctgccaatc   20

<210> 27
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 27
gtcttttcct actatctacc   20

<210> 28
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 28
ctttcccagc tgctactatc   20

<210> 29
<211> 1524
<212> DNA
<213> Penicillium citrinum

<400> 29
aactggaaga attcgcggcc gcaggaattt tttttttttt tttttttcaa cgaaggtaga   60

agtaattttg acaaagatac aagacgaatt cgctatttgt agatgaatat gcgtgtgtca   120

```
attgaagccg aattcaggat agatttgcca tctgctctat tgccaatttc taatccatct    180

ttatcatgaa caacactcaa accacacatc tgaattcacg gcgctgaacg atctaggcca    240

acttcagagc cgggttcatc gagaacatag tgaggattga agaaaagtgg tctacaaagg    300

cctgagcgtg ctcagggcca tacagcgagc tctgaagttt gacatgaatg agtgggtcct    360

tggtagggtc atcccacatc tcgagaacga tgtcataagg agtgcgctca cgggaagcga    420

gaacactcgt cattttggca ttgccaattg agccactctc cgcttgaccc tgcttgtaat    480

caaagacagc ctggaacaag ggggcgtgtg tctgagtctt gggttcctcg cctgaggtag    540

ggagattcag gcctagacag tcgaggatga cgccatacgg cacccgcgcg tgttgcatgg    600

cctcacgcac actgtccttg gtggctacaa ggtgctcgcc gaatgtcttg ctgccgacga    660

actcatcaaa gcgcagggga agcacgttag cgaaaaagcc catcgccgaa atttcttcca    720

tggtggatcg gttggtttcg gcgaggccga tggttatgtc tttgctgccg gtaagacgcg    780

ccaacaaaac gtggtaggcg gccaggtaga actgcatggg ggttgccttg tgcttgcggc    840

tccgctcttt gattcggaag gcgaccatgg gatctaaacg agcaattgct tcatactgct    900

gccacgtgaa tggctgtatt tgctgctgct ctgaattggc agcagggtca ttgatcagat    960

tcatgatggg aagcacggtt ggcgcagatg acgagacttt gctatgcatg gacttccaga   1020

acgcgatatc gtcccccatt cgcccatttt ccaggttttc ccgctgttgg acggctagat   1080

cagagaattg ggtcgatggt cgctgcattt tcaccccgct gtaaatctgc ccgatctcat   1140

tgaacaggtt ttctgttgtt gagccatcac caactaatct gtggtagccg attaccaaca   1200
```

ggtggtcatc tgtgccccag tagaaatcaa cgagtctgag agtgtcacct gtggagatgc   1260

tatagtttgt cttctcgagt ttccggtact cttcctctgc ctccgcagcg ttgttcacct   1320

gaacaaagtg cactctgttc tccgggttct tgagaaccac ttggacggga ccatttaaat   1380

cgctgctata gtcatcgcca gtaacaaagc acgtacggaa gatctcgtga cggcgcaatg   1440

aggctttcag agcccgcctc aaccggtcga ggtcaatggt acccttcatg aacatgccaa   1500

tagtgttgtt gaagatggta tgat   1524

<210> 30
<211> 784
<212> DNA
<213> Penicillium citrinum

<400> 30
aactggaaga attcgcggcc gcaggaattt ttttttttttt ttttttttttc tttgttgctt   60

ctcagggcca ctgtaatggt atttcaggta tctctattta ctgctatcca gaagtcaggc   120

attaaatagt caggctcagc ccaggctcga ttcagattgg attcaggctt cagaccatgg   180

ccgctatgct ccttcgtact atacctccgt cgagctatac ccgcttggcc agacaaaagg   240

cttcactgaa cccttcaact taactgcatt tcgccacaac taactcgacg aggccggcga   300

tggtgttacc attcatgagc tcaaagatcg acacatcaac atggatttca gatgtgatcc   360

agtttcgaag ttcaatggcg acgagtgagt ctacgccgac acctgccagg tttttggacg   420

aggacatgtc gtcttctgcc agaccaaaca ttcgcatcag cttttccgtc attgctttga   480

ggacgataga aatggcctcg tcgtgagagg tgaccctgct tagttgggcc cgcacgccat   540

ctggtccttt tttatgcgaa gagacaaagg attggtctgc atgaaggact tggcggtatt   600

taagtcccac aaaccgctgt tcctgtatcc agtttgcctc ggtccagtga gcacccgggg   660

atgtgttgat tcctgtaacc acagctgcgg gaggtgatgg aaattgaggg gaagaacaca   720

ggattgcctt ctccaacaca tccatgacgt ccttttcatg cataggcttg taacctattc   780

tagc   784

<210> 31
<211> 764
<212> DNA
<213> Penicillium citrinum

<400> 31
aactggaaga attcgcggcc gcaggaattt tttttttttt ttttttttttc gaataaaatg   60

cgttttattt tactaaccta ctcgactaat acagcaccta gtttctctgg gacggaaacc   120

attggaataa gcctggggac ggatgcatat ttgtttttagt ttgcgtgtta tatcttagca   180

ccggtcatga gggagcggga tgtcctcgtt gcgccggcgt accatgagct ttgtggttgg   240

atgcatacga acgctaaaag cgtgacggta gtatttgtca tcgtctcctg gtacaggctt   300

cacatcatac tgaatcagta tatgagcgag gagaatcttg atttccttcg aggcgaagaa   360

ccgcccggga caagcgcgtg ggttccagcc gaagccgatg tgatcaccgt tggtattctc   420

caattgagcg gtgaaggcct tgtctggatc ctcgcgcatg cgcataaatc ggtagggatc   480

ataattttcg gggtttttccc acacatcagg gttgttcatg cggtctgcag ccacagcggc   540

caactcgccc ttgggaatga agaggccatt ggatagagtg atgtctctga gagcggtact   600

gcgcatagtg gcgcactcga ccggcttgat tcgctgcgtc tctttcatgc agctgtcgag   660

gagcttcagc ttgaacagag aggcaggcgt ccagcccct tctccgatta cagtgcggat   720

ctcttggcgg agaggctgaa taaggtctgg gtgcctggca atgt   764

<210> 32
<211> 765
<212> DNA
<213> Penicillium citrinum

<400> 32
aactggaaga attcgcggcc gcaggaattt tttttttttt ttttttctgg aaaaggacca   60

tctctttata tattcttctt ccctactact tgcatcgtaa atttcaacaa catataaaca   120

tgagataccc tttctggccg ttcactctac cacctgcctg tctcattgca ttgtgctttt   180

gaaaattatg acaataacaa ccaatgagaa aaaatatgat cctcctgcaa tgaatccact   240

ggaggggggta cggagcttgg aatgctccta agattccgac ctaatcagcg tcgagcccga   300

tcagtagctg cagcactcgg cctcagtgca ttgttaggaa cagggactgt cctggttccg   360

cctgacgggg agacacttcg agaaggggct gaagatgccg gggcagaacg gttgtgcgcc   420

atgtgcgcct tgaccaggtg accggcggct agggcagcac atagcgagag ctccccagcc   480

aaaacagcgc ttccgatgat gcgcgcaagt tgacgtgcat tctcaccggg agtggtcggg   540

tgtgatccgc ggacaccaag catgtcaagc attgcgccct ggggctccag aatcgtacca   600

ccgcccaacg ttccaacctc aatagacggc atggagacag agatttgaag cgatccgcga   660

agattgttca tgagagtgat gcagttagcg ctctccacaa cttgcgccgg atcctgacct   720

gtggcaatga aaatggctgc cgcaagattg gcagcttggg cgttg   765

<210> 33
<211> 802
<212> DNA
<213> Penicillium citrinum

<400> 33
aactggaaga attcgcggcc gcaggaattt tttttttttt tttttataga atctttgaaa   60

tcgacattaa ttaagtatgt ggagattctt tgtggaggca cggtaatgtg tctatctagc   120

aacgcggtca agcatcagtc tcaggcacag cccgggtgtc gtttttggtt gcaatcttcc   180

gccatcccat tccaaaggca aacacaaacg tgcacgccgt agctcccact gctaagtaaa   240

aagtatgatc aacggcgaga ctgtaagctt ttacaacccc tggaaggtta ttcttgctga   300

ccacatctct gaagccagtc gcccctgctg ccgtcacggc ctgcgtgtcg acagtgggcg   360

catacttgct caggccagtt ctcaaaccgg acccaaagac aaggttagca aagtccagga   420

agagcgatcc tccaaacgtc tgtccaaaca cggcgagaga aattccgagg gcaccttgtt   480

cgggcgaaag cgtgctttgg atggcgatga taggcgtttg catgccacaa ccacgaccga   540

agcccgcgat aaattggtac atgacccatt tcacagttga tgtatggggc tggaaggtgg   600

ataccagacc tgcgcctatg gcgacgagaa cagcgctgcc tagggcccaa ggcaaatagt   660

atcctgtctt tccaattgcg aagccagaaa ccatagccat aatgacttgt ccaagaattc   720

caggcaacat gtacacacca ctcagtgtgg gagaaacatc cttcacagcc tggaagtaga   780

tcggtagata gtaggaaaag ac   802

<210> 34
<211> 562
<212> DNA
<213> Penicillium citrinum

<400> 34
aactggaaga attcgcggcc gcaggaattt tttttttttt ttttttttac taagcaatat   60

tgtgtttctt cgctaatgcg aatatttcct tatagcaacg tcgcaacaca tttatcgtct   120

tccctgaggc ctttgttgac ttgggctctt cgtctccggc ttcgtcactc caaagcacag   180

ataggagacg agaggccggc gttatggttt tattttcagc gccaaggatt tgccacgatg   240

tgcttggcat atctgatagg actagacgaa tagatgccgc agccccgtgc tcctgtgcta   300

tccccaaagc agtctcaatc ccactcaata gtcgaaggct tacacgcaat gtcgtgcatg   360

cagaagataa ggcgtgcatg aatgggtcga gatgtgaaat gagctcgccg atatgaagat   420

tagagtgaaa cgagggaagt gcttcggctc ttccattgtc atttctagtg gttgagccag   480

accagtacca atccattcgt gtgctttgct tttgtccaca aggttgggct ttcatcacct   540

cggatagtag cagctgggaa ag   562

<210> 35
<211> 26
<212> DNA

<213> Penicillium citrinum

<400> 35
gttaacatgt cagaacctct accccc   26

<210> 36
<211> 27
<212> DNA
<213> Penicillium citrinum

<400> 36
aatatttcaa gcatcagtct caggcac   27

<210> 37
<211> 1662
<212> DNA
<213> Penicillium citrinum

<220>
<221> CDS
<222> (1)..(1662)

<400> 37
atg tca gaa cct cta ccc cct aaa gaa ggg gaa cca agg cca cag aag   48
Met Ser Glu Pro Leu Pro Pro Lys Glu Gly Glu Pro Arg Pro Gln Lys
1   5   10   15

gaa gaa agt caa aat gac acg ctc gaa gcg act gag tcc aag tcc cag   96
Glu Glu Ser Gln Asn Asp Thr Leu Glu Ala Thr Glu Ser Lys Ser Gln
            20   25   30

cac atc aca ggc ctc aag ctc ggg ctg gtg gtt gct tca gtt act ttc   144
His Ile Thr Gly Leu Lys Leu Gly Leu Val Val Ala Ser Val Thr Phe
            35   40   45

```
gta gca ttt ttg atg ctc ctt gat atg tcc att atc gtc acg gca atc        192
Val Ala Phe Leu Met Leu Leu Asp Met Ser Ile Ile Val Thr Ala Ile
    50                  55                  60


cca cat atc aca agc gag ttc cac tct ctg aac gat gta ggg tgg tac        240
Pro His Ile Thr Ser Glu Phe His Ser Leu Asn Asp Val Gly Trp Tyr
65                  70                  75                  80


ggc agt gct tat ctt ctg gct aac tgt gct ctc cag ccc ctg gcc ggt        288
Gly Ser Ala Tyr Leu Leu Ala Asn Cys Ala Leu Gln Pro Leu Ala Gly
                85                  90                  95


aaa ttg tat aca ctc ttg ggc ttg aag tac act ttc ttt gcc ttc ctc        336
Lys Leu Tyr Thr Leu Leu Gly Leu Lys Tyr Thr Phe Phe Ala Phe Leu
            100                 105                 110


tgt att ttt gaa cta ggc tcg gtg cta tgc ggt gcc gca aga tct tcc        384
Cys Ile Phe Glu Leu Gly Ser Val Leu Cys Gly Ala Ala Arg Ser Ser
            115                 120                 125


acc atg ttg att gtt ggg cgg gcc gtt gct gga atg gga ggc tca ggt        432
Thr Met Leu Ile Val Gly Arg Ala Val Ala Gly Met Gly Gly Ser Gly
    130                 135                 140


ctt gtc aac gga gcc ctc aca atc ctc tca aca gct gct cct aag cac        480
Leu Val Asn Gly Ala Leu Thr Ile Leu Ser Thr Ala Ala Pro Lys His
145                 150                 155                 160


aag caa cca gtt ttg att gga gtg atg atg ggt ctt agt cag att gcc        528
Lys Gln Pro Val Leu Ile Gly Val Met Met Gly Leu Ser Gln Ile Ala
                165                 170                 175


att gtc tgt gga cca ctg ctc gga ggt gct ttc act caa cac gcc act        576
Ile Val Cys Gly Pro Leu Leu Gly Gly Ala Phe Thr Gln His Ala Thr
                180                 185                 190
```

```
tgg cga tgg tgc ttt tat atc aat ctc ccc atc ggc gct gtc gct gca        624
Trp Arg Trp Cys Phe Tyr Ile Asn Leu Pro Ile Gly Ala Val Ala Ala
        195             200             205


ttc ctc ctt ctc gtc atc acc ata ccc gac cga att tca tcc acg gac        672
Phe Leu Leu Leu Val Ile Thr Ile Pro Asp Arg Ile Ser Ser Thr Asp
        210             215             220


agc gaa ctc tcg acc gac aaa cca atg gcc aac ata aaa tcc aca ctt        720
Ser Glu Leu Ser Thr Asp Lys Pro Met Ala Asn Ile Lys Ser Thr Leu
225             230             235             240


cgc aaa ctg gac ctt gta ggc ttt gtg gtc ttt gca gcc ttc gca acc        768
Arg Lys Leu Asp Leu Val Gly Phe Val Val Phe Ala Ala Phe Ala Thr
            245             250             255


atg att tcc ctc gca cta gaa tgg gga ggg tcg acc tac acc tgg cga        816
Met Ile Ser Leu Ala Leu Glu Trp Gly Gly Ser Thr Tyr Thr Trp Arg
            260             265             270


agt tcc gtc atc atc ggc ctg ttc tgt ggc gga ggg ttt gct ctg att        864
Ser Ser Val Ile Ile Gly Leu Phe Cys Gly Gly Gly Phe Ala Leu Ile
            275             280             285


gcg ttc gtg cta tgg gag cgt cat gtt ggc gat gct gtt gcc atg att        912
Ala Phe Val Leu Trp Glu Arg His Val Gly Asp Ala Val Ala Met Ile
            290             295             300


cct ggc tca gtg gct ggt aaa cga caa gtg tgg tgc tct tgt tta ttt        960
Pro Gly Ser Val Ala Gly Lys Arg Gln Val Trp Cys Ser Cys Leu Phe
305             310             315             320


atg ggc ttt ttc tct ggc tcc ttg ctt gtc ttt tcc tac tat cta ccg      1008
Met Gly Phe Phe Ser Gly Ser Leu Leu Val Phe Ser Tyr Tyr Leu Pro
            325             330             335
```

atc tac ttc cag gct gtg aag gat gtt tct ccc aca ctg agt ggt gtg   1056
Ile Tyr Phe Gln Ala Val Lys Asp Val Ser Pro Thr Leu Ser Gly Val
        340   345   350

tac atg ttg cct gga att ctt gga caa gtc att atg gct atg gtt tct   1104
Tyr Met Leu Pro Gly Ile Leu Gly Gln Val Ile Met Ala Met Val Ser
        355   360   365

ggc ttc gca att gga aag aca gga tac tat ttg cct tgg gcc cta ggc   1152
Gly Phe Ala Ile Gly Lys Thr Gly Tyr Tyr Leu Pro Trp Ala Leu Gly
        370   375   380

agc gct gtt ctc gtc gcc ata ggc gca ggt ctg gta tcc acc ttc cag   1200
Ser Ala Val Leu Val Ala Ile Gly Ala Gly Leu Val Ser Thr Phe Gln
385   390   395   400

ccc cat aca tca act gtg aaa tgg gtc atg tac caa ttt atc gcg ggc   1248
Pro His Thr Ser Thr Val Lys Trp Val Met Tyr Gln Phe Ile Ala Gly
            405   410   415

ttc ggt cgt ggt tgt ggc atg caa acg cct atc atc gcc atc caa agc   1296
Phe Gly Arg Gly Cys Gly Met Gln Thr Pro Ile Ile Ala Ile Gln Ser
            420   425   430

acg ctt tcg ccc gaa caa ggt gcc ctc gga att tct ctc gcc gtg ttt   1344
Thr Leu Ser Pro Glu Gln Gly Ala Leu Gly Ile Ser Leu Ala Val Phe
        435   440   445

gga cag acg ttt gga gga tcg ctc ttc ctg gac ttt gct aac ctt gtc   1392
Gly Gln Thr Phe Gly Gly Ser Leu Phe Leu Asp Phe Ala Asn Leu Val
        450   455   460

ttt ggg tcc ggt ttg aga act ggc ctg agc aag tat gcg ccc act gtc   1440
Phe Gly Ser Gly Leu Arg Thr Gly Leu Ser Lys Tyr Ala Pro Thr Val
465   470   475   480

```
gac acg cag gcc gtg acg gca gca ggg gcg act ggc ttc aga gat gtg        1488
Asp Thr Gln Ala Val Thr Ala Ala Gly Ala Thr Gly Phe Arg Asp Val
                485             490             495

gtc agc aag aat aac ctt cca ggg gtt gta aaa gct tac agt ctc gcc        1536
Val Ser Lys Asn Asn Leu Pro Gly Val Val Lys Ala Tyr Ser Leu Ala
                500             505             510

gtt gat cat act ttt tac tta gca gtg gga gct acg gcg tgc acg ttt        1584
Val Asp His Thr Phe Tyr Leu Ala Val Gly Ala Thr Ala Cys Thr Phe
            515             520             525

gtg ttt gcc ttt gga atg gga tgg cgg aag att gca acc aaa aac gac        1632
Val Phe Ala Phe Gly Met Gly Trp Arg Lys Ile Ala Thr Lys Asn Asp
        530             535             540

acc cgg gct gtg cct gag act gat gct tga                               1662
Thr Arg Ala Val Pro Glu Thr Asp Ala
545                 550


<210>  38
<211>  553
<212>  PRT
<213>  Penicillium citrinum


<400>  38

Met Ser Glu Pro Leu Pro Pro Lys Glu Gly Glu Pro Arg Pro Gln Lys
1               5               10               15

Glu Glu Ser Gln Asn Asp Thr Leu Glu Ala Thr Glu Ser Lys Ser Gln
            20              25              30
```

His Ile Thr Gly Leu Lys Leu Gly Leu Val Val Ala Ser Val Thr Phe
      35   40   45

Val Ala Phe Leu Met Leu Leu Asp Met Ser Ile Ile Val Thr Ala Ile
      50   55   60

Pro His Ile Thr Ser Glu Phe His Ser Leu Asn Asp Val Gly Trp Tyr
65   70   75   80

Gly Ser Ala Tyr Leu Leu Ala Asn Cys Ala Leu Gln Pro Leu Ala Gly
            85   90   95

Lys Leu Tyr Thr Leu Leu Gly Leu Lys Tyr Thr Phe Phe Ala Phe Leu
            100   105   110

Cys Ile Phe Glu Leu Gly Ser Val Leu Cys Gly Ala Ala Arg Ser Ser
            115   120   125

Thr Met Leu Ile Val Gly Arg Ala Val Ala Gly Met Gly Gly Ser Gly
      130   135   140

Leu Val Asn Gly Ala Leu Thr Ile Leu Ser Thr Ala Ala Pro Lys His
145   150   155   160

Lys Gln Pro Val Leu Ile Gly Val Met Met Gly Leu Ser Gln Ile Ala
            165   170   175

Ile Val Cys Gly Pro Leu Leu Gly Gly Ala Phe Thr Gln His Ala Thr
          180   185   190

Trp Arg Trp Cys Phe Tyr Ile Asn Leu Pro Ile Gly Ala Val Ala Ala
          195   200   205

Phe Leu Leu Leu Val Ile Thr Ile Pro Asp Arg Ile Ser Ser Thr Asp
     210   215   220

Ser Glu Leu Ser Thr Asp Lys Pro Met Ala Asn Ile Lys Ser Thr Leu
225   230   235   240

Arg Lys Leu Asp Leu Val Gly Phe Val Val Phe Ala Ala Phe Ala Thr
               245   250   255

Met Ile Ser Leu Ala Leu Glu Trp Gly Gly Ser Thr Tyr Thr Trp Arg
          260   265   270

Ser Ser Val Ile Ile Gly Leu Phe Cys Gly Gly Gly Phe Ala Leu Ile
          275   280   285

Ala Phe Val Leu Trp Glu Arg His Val Gly Asp Ala Val Ala Met Ile
     290   295   300

Pro Gly Ser Val Ala Gly Lys Arg Gln Val Trp Cys Ser Cys Leu Phe
305   310   315   320

Met Gly Phe Phe Ser Gly Ser Leu Leu Val Phe Ser Tyr Tyr Leu Pro
                325   330   335

Ile Tyr Phe Gln Ala Val Lys Asp Val Ser Pro Thr Leu Ser Gly Val
              340   345   350

Tyr Met Leu Pro Gly Ile Leu Gly Gln Val Ile Met Ala Met Val Ser
            355   360   365

Gly Phe Ala Ile Gly Lys Thr Gly Tyr Tyr Leu Pro Trp Ala Leu Gly
      370   375   380

Ser Ala Val Leu Val Ala Ile Gly Ala Gly Leu Val Ser Thr Phe Gln
385   390   395   400

Pro His Thr Ser Thr Val Lys Trp Val Met Tyr Gln Phe Ile Ala Gly
                405   410   415

Phe Gly Arg Gly Cys Gly Met Gln Thr Pro Ile Ile Ala Ile Gln Ser
            420   425   430

Thr Leu Ser Pro Glu Gln Gly Ala Leu Gly Ile Ser Leu Ala Val Phe
          435   440   445

Gly Gln Thr Phe Gly Gly Ser Leu Phe Leu Asp Phe Ala Asn Leu Val
      450   455   460

Phe Gly Ser Gly Leu Arg Thr Gly Leu Ser Lys Tyr Ala Pro Thr Val
465   470   475   480

Asp Thr Gln Ala Val Thr Ala Ala Gly Ala Thr Gly Phe Arg Asp Val
                485   490   495

Val Ser Lys Asn Asn Leu Pro Gly Val Val Lys Ala Tyr Ser Leu Ala
                500   505   510

Val Asp His Thr Phe Tyr Leu Ala Val Gly Ala Thr Ala Cys Thr Phe
        515   520   525

Val Phe Ala Phe Gly Met Gly Trp Arg Lys Ile Ala Thr Lys Asn Asp
        530   535   540

Thr Arg Ala Val Pro Glu Thr Asp Ala
545   550

<210>   39
<211>   31
<212>   DNA
<213>   Penicillium citrinum

<400>   39
ggatccatgt ccctgccgca tgcaacgatt c   31

<210>   40
<211>   30

<210> 40

<212> DNA

<213> Penicillium citrinum

<400> 40

ggatccctaa gcaatattgt gtttcttcgc   30

<210> 41

<211> 1380

<212> DNA

<213> Penicillium citrinum

<220>

<221> CDS

<222> (1)..(1380)

<400> 41

atg tcc ctg ccg cat gca acg att ccg acg aac cta cgc cgt cgc gcg   48
Met Ser Leu Pro His Ala Thr Ile Pro Thr Asn Leu Arg Arg Arg Ala
1   5   10   15

ttt cga cgc tca tgt gac cgg tgt cat gca caa aag ctc aaa tgt acc   96
Phe Arg Arg Ser Cys Asp Arg Cys His Ala Gln Lys Leu Lys Cys Thr
                20   25   30

ggt agc aat gcc aat tta gtc cgt gct cag tgt caa cgt tgt caa caa   144
Gly Ser Asn Ala Asn Leu Val Arg Ala Gln Cys Gln Arg Cys Gln Gln
            35   40   45

gcc gga tta agg tgt gtg tac agc gaa agg cta ccc aag cgc aat tta   192
Ala Gly Leu Arg Cys Val Tyr Ser Glu Arg Leu Pro Lys Arg Asn Leu
        50   55   60

cat aaa gaa gcc gca gct gga act aca aga gcc aca gaa acc tca caa   240
His Lys Glu Ala Ala Ala Gly Thr Thr Arg Ala Thr Glu Thr Ser Gln
65   70   75   80

```
ccg atg acc gcg aca tct tct acg gtc ttc tca tca ttg gca gag act          288
Pro Met Thr Ala Thr Ser Ser Thr Val Phe Ser Ser Leu Ala Glu Thr
            85                    90                95


cct cca cct tac tgc tca cca cct acg cat att ggc acc tcg gca ctc          336
Pro Pro Pro Tyr Cys Ser Pro Pro Thr His Ile Gly Thr Ser Ala Leu
            100               105               110


aag gaa aca tta tca gaa cca tca gcg gca acc ctg caa ttc tat gat          384
Lys Glu Thr Leu Ser Glu Pro Ser Ala Ala Thr Leu Gln Phe Tyr Asp
            115               120               125


aca tca atc aac ttt gat gat ccc gag tcg ttt ccc ggc ggc tgg cct          432
Thr Ser Ile Asn Phe Asp Asp Pro Glu Ser Phe Pro Gly Gly Trp Pro
        130               135               140


cag cca aat aca ttt cgc gac gat gcc aac agc aat gaa tct tcg ggg          480
Gln Pro Asn Thr Phe Arg Asp Asp Ala Asn Ser Asn Glu Ser Ser Gly
145               150               155               160


ata cca gat cta ggc tac gac ttt gaa ggc cct ttg gat gca acg gcg          528
Ile Pro Asp Leu Gly Tyr Asp Phe Glu Gly Pro Leu Asp Ala Thr Ala
                165               170               175


cct gtc tcg cca tcg ctg ttt gac ctc gaa gta gag ggg aac tcg tca          576
Pro Val Ser Pro Ser Leu Phe Asp Leu Glu Val Glu Gly Asn Ser Ser
            180               185               190


tcc gga caa tcc aac aca agc aac acg caa cga gac ctt ttc gaa agt          624
Ser Gly Gln Ser Asn Thr Ser Asn Thr Gln Arg Asp Leu Phe Glu Ser
            195               200               205


ctg tcg gat gtg tca cag gac cta gag gta ata ctc cac ggg gtg act          672
Leu Ser Asp Val Ser Gln Asp Leu Glu Val Ile Leu His Gly Val Thr
        210               215               220
```

```
gtg gaa tgg ccc aag caa aaa att tta agc tac ccg ata ggg gac ttt      720
Val Glu Trp Pro Lys Gln Lys Ile Leu Ser Tyr Pro Ile Gly Asp Phe
225             230             235             240


ttg aat gcc ttt ggt aga ttg cta cta cat ctt caa gaa cgt gtg atc      768
Leu Asn Ala Phe Gly Arg Leu Leu Leu His Leu Gln Glu Arg Val Ile
                245             250             255


acg agc agc aat agc agc atg tta gat ggg tgt ctg caa acc aag aac      816
Thr Ser Ser Asn Ser Ser Met Leu Asp Gly Cys Leu Gln Thr Lys Asn
                260             265             270


ttg ttc atg gcg gtg cat tgc tac atg ttg tct gtc aaa atc atg aca      864
Leu Phe Met Ala Val His Cys Tyr Met Leu Ser Val Lys Ile Met Thr
            275             280             285


tca ctt tcc cag ctg cta cta tcc gag gtg atg aaa gcc caa cct tgt      912
Ser Leu Ser Gln Leu Leu Leu Ser Glu Val Met Lys Ala Gln Pro Cys
    290             295             300


gga caa aag caa agc aca cga atg gat tgg tac tgg tct ggc tca acc      960
Gly Gln Lys Gln Ser Thr Arg Met Asp Trp Tyr Trp Ser Gly Ser Thr
305             310             315             320


act aga aat gac aat gga aga gcc gaa gca ctt ccc tcg ttt cac tct      1008
Thr Arg Asn Asp Asn Gly Arg Ala Glu Ala Leu Pro Ser Phe His Ser
                325             330             335


aat ctt cat atc ggc gag ctc att tca cat ctc gac cca ttc atg cac      1056
Asn Leu His Ile Gly Glu Leu Ile Ser His Leu Asp Pro Phe Met His
            340             345             350


gcc tta tct tct gca tgc acg aca ttg cgt gta agc ctt cga cta ttg      1104
Ala Leu Ser Ser Ala Cys Thr Thr Leu Arg Val Ser Leu Arg Leu Leu
            355             360             365
```

agt gag att gag act gct ttg ggg ata gca cag gag cac ggg gct gcg   1152
Ser Glu Ile Glu Thr Ala Leu Gly Ile Ala Gln Glu His Gly Ala Ala
    370   375   380

gca tct att cgt cta gtc cta tca gat atg cca agc aca tcg tgg caa   1200
Ala Ser Ile Arg Leu Val Leu Ser Asp Met Pro Ser Thr Ser Trp Gln
385   390   395   400

atc ctt ggc gct gaa aat aaa acc ata acg ccg gcc tct cgt ctc cta   1248
Ile Leu Gly Ala Glu Asn Lys Thr Ile Thr Pro Ala Ser Arg Leu Leu
                  405   410   415

tct gtg ctt tgg agt gac gaa gcc gga gac gaa gag ccc aag tca aca   1296
Ser Val Leu Trp Ser Asp Glu Ala Gly Asp Glu Glu Pro Lys Ser Thr
                  420   425   430

aag gcc tca ggg aag acg ata aat ttg ttg cga cgt tgc tat aag gaa   1344
Lys Ala Ser Gly Lys Thr Ile Asn Val Leu Arg Arg Cys Tyr Lys Glu
          435   440   445

ata ttc gca tta gcg aag aaa cac aat att gct tag   1380
Ile Phe Ala Leu Ala Lys Lys His Asn Ile Ala
    450   455

<210> 42
<211> 459
<212> PRT
<213> Penicillium citrinum

<400> 42

Met Ser Leu Pro His Ala Thr Ile Pro Thr Asn Leu Arg Arg Arg Ala
1   5   10   15

```
Phe Arg Arg Ser Cys Asp Arg Cys His Ala Gln Lys Leu Lys Cys Thr
            20                  25                  30


Gly Ser Asn Ala Asn Leu Val Arg Ala Gln Cys Gln Arg Cys Gln Gln
            35                  40                  45


Ala Gly Leu Arg Cys Val Tyr Ser Glu Arg Leu Pro Lys Arg Asn Leu
            50                  55                  60


His Lys Glu Ala Ala Ala Gly Thr Thr Arg Ala Thr Glu Thr Ser Gln
65                  70                  75                  80


Pro Met Thr Ala Thr Ser Ser Thr Val Phe Ser Ser Leu Ala Glu Thr
                85                  90                  95


Pro Pro Pro Tyr Cys Ser Pro Pro Thr His Ile Gly Thr Ser Ala Leu
                100                 105                 110


Lys Glu Thr Leu Ser Glu Pro Ser Ala Ala Thr Leu Gln Phe Tyr Asp
            115                 120                 125


Thr Ser Ile Asn Phe Asp Asp Pro Glu Ser Phe Pro Gly Gly Trp Pro
            130                 135                 140


Gln Pro Asn Thr Phe Arg Asp Asp Ala Asn Ser Asn Glu Ser Ser Gly
145                 150                 155                 160
```

Ile Pro Asp Leu Gly Tyr Asp Phe Glu Gly Pro Leu Asp Ala Thr Ala
                165   170   175

Pro Val Ser Pro Ser Leu Phe Asp Leu Glu Val Glu Gly Asn Ser Ser
            180   185   190

Ser Gly Gln Ser Asn Thr Ser Asn Thr Gln Arg Asp Leu Phe Glu Ser
            195   200   205

Leu Ser Asp Val Ser Gln Asp Leu Glu Val Ile Leu His Gly Val Thr
        210   215   220

Val Glu Trp Pro Lys Gln Lys Ile Leu Ser Tyr Pro Ile Gly Asp Phe
225   230   235   240

Leu Asn Ala Phe Gly Arg Leu Leu Leu His Leu Gln Glu Arg Val Ile
            245   250   255

Thr Ser Ser Asn Ser Ser Met Leu Asp Gly Cys Leu Gln Thr Lys Asn
            260   265   270

Leu Phe Met Ala Val His Cys Tyr Met Leu Ser Val Lys Ile Met Thr
        275   280   285

Ser Leu Ser Gln Leu Leu Leu Ser Glu Val Met Lys Ala Gln Pro Cys
    290   295   300

Gly Gln Lys Gln Ser Thr Arg Met Asp Trp Tyr Trp Ser Gly Ser Thr
305   310   315   320

Thr Arg Asn Asp Asn Gly Arg Ala Glu Ala Leu Pro Ser Phe His Ser
                325   330   335

Asn Leu His Ile Gly Glu Leu Ile Ser His Leu Asp Pro Phe Met His
                340   345   350

Ala Leu Ser Ser Ala Cys Thr Thr Leu Arg Val Ser Leu Arg Leu Leu
            355   360   365

Ser Glu Ile Glu Thr Ala Leu Gly Ile Ala Gln Glu His Gly Ala Ala
        370   375   380

Ala Ser Ile Arg Leu Val Leu Ser Asp Met Pro Ser Thr Ser Trp Gln
385   390   395   400

Ile Leu Gly Ala Glu Asn Lys Thr Ile Thr Pro Ala Ser Arg Leu Leu
                405   410   415

Ser Val Leu Trp Ser Asp Glu Ala Gly Asp Glu Glu Pro Lys Ser Thr
                420   425   430

Lys Ala Ser Gly Lys Thr Ile Asn Val Leu Arg Arg Cys Tyr Lys Glu
                435   440   445

Ile Phe Ala Leu Ala Lys Lys His Asn Ile Ala
    450   455

<210> 43
<211> 9099
<212> DNA
<213> Penicillium citrinum

<220>
<221> CDS
<222> (1)..(9099)

<400> 43
atg gat caa gcc aac tat cca aac gag cca att gtg gta gtg gga agc   48
Met Asp Gln Ala Asn Tyr Pro Asn Glu Pro Ile Val Val Val Gly Ser
1   5   10   15

ggt tgt cgg ttt cca ggt ggt gtc aac aca cca tca aaa ctt tgg gag   96
Gly Cys Arg Phe Pro Gly Gly Val Asn Thr Pro Ser Lys Leu Trp Glu
                20   25   30

ctg ctc aaa gag ccc cgg gat gta cag acc aag atc cct aag gag aga   144
Leu Leu Lys Glu Pro Arg Asp Val Gln Thr Lys Ile Pro Lys Glu Arg
            35   40   45

ttt gac gtc gat aca ttt tac agc ccc gat ggc act cac ccc ggg cgc   192
Phe Asp Val Asp Thr Phe Tyr Ser Pro Asp Gly Thr His Pro Gly Arg
    50   55   60

acg aac gca ccc ttt gca tac ttg ctg cag gag gat cta cgc ggt ttt   240
Thr Asn Ala Pro Phe Ala Tyr Leu Leu Gln Glu Asp Leu Arg Gly Phe
65   70   75   80

gat gcc tct ttc ttc aac atc caa gct gga gag gcc gaa acg att gac   288

Asp Ala Ser Phe Phe Asn Ile Gln Ala Gly Glu Ala Glu Thr Ile Asp
         85   90   95

cca cag caa agg ctg ctg ctg gag acg gtc tat gaa gct gta tcc aac   336
Pro Gln Gln Arg Leu Leu Leu Glu Thr Val Tyr Glu Ala Val Ser Asn
         100   105   110

gca ggc cta cgg atc caa ggc ctt caa gga tcc tct act gct gtg tac   384
Ala Gly Leu Arg Ile Gln Gly Leu Gln Gly Ser Ser Thr Ala Val Tyr
         115   120   125

gtc ggt atg atg acg cat gac tat gag act atc gtg acg cgt gaa ttg   432
Val Gly Met Met Thr His Asp Tyr Glu Thr Ile Val Thr Arg Glu Leu
         130   135   140

gat agt att cct aca tac tct gcc acg ggg gta gct gtc agt gtg gcc   480
Asp Ser Ile Pro Thr Tyr Ser Ala Thr Gly Val Ala Val Ser Val Ala
145   150   155   160

tcc aac cgt gta tca tac ttc ttc gac tgg cat ggg ccg agt atg acg   528
Ser Asn Arg Val Ser Tyr Phe Phe Asp Trp His Gly Pro Ser Met Thr
            165   170   175

atc gac aca gcc tgt agt tca tcc tta gct gcc gtg cat ctg gcc gtc   576
Ile Asp Thr Ala Cys Ser Ser Ser Leu Ala Ala Val His Leu Ala Val
         180   185   190

caa cag ctt aga acg ggc gag agt acc atg gcg gtt gca gcc ggt gcg   624
Gln Gln Leu Arg Thr Gly Glu Ser Thr Met Ala Val Ala Ala Gly Ala
         195   200   205

aat ctg ata ttg ggc ccc atg acc ttt gta atg gag agc aaa ttg aac   672
Asn Leu Ile Leu Gly Pro Met Thr Phe Val Met Glu Ser Lys Leu Asn
         210   215   220

atg ctg tcc ccc aat ggt aga tct cga atg tgg gat gct gct gcc gat   720

```
Met Leu Ser Pro Asn Gly Arg Ser Arg Met Trp Asp Ala Ala Ala Asp
225              230              235              240


gga tat gcc aga gga gaa ggt gtt tgc tct att gtc ctg aaa acg ctg        768
Gly Tyr Ala Arg Gly Glu Gly Val Cys Ser Ile Val Leu Lys Thr Leu
                 245              250              255


agc cag gca ctg cgc gac ggg gac agt atc gag tgt gtt atc cga gag        816
Ser Gln Ala Leu Arg Asp Gly Asp Ser Ile Glu Cys Val Ile Arg Glu
             260              265              270


acc ggt atc aac caa gat ggc cga acg aca ggt atc aca atg cca aac        864
Thr Gly Ile Asn Gln Asp Gly Arg Thr Thr Gly Ile Thr Met Pro Asn
             275              280              285


cat agc gca caa gaa gcc ctc att cgg gcc aca tat gcc aag gct ggt        912
His Ser Ala Gln Glu Ala Leu Ile Arg Ala Thr Tyr Ala Lys Ala Gly
         290              295              300


ctt gat att acc aac ccc cag gaa cgc tgc cag ttc ttt gaa gcc cat        960
Leu Asp Ile Thr Asn Pro Gln Glu Arg Cys Gln Phe Phe Glu Ala His
305              310              315              320


gga act ggt aca cca gcc ggt gac cca cag gaa gct gag gct att gca       1008
Gly Thr Gly Thr Pro Ala Gly Asp Pro Gln Glu Ala Glu Ala Ile Ala
                 325              330              335


aca gcc ttc ttc gga cac aag gat gga aca atc gac agc gac ggc gag       1056
Thr Ala Phe Phe Gly His Lys Asp Gly Thr Ile Asp Ser Asp Gly Glu
             340              345              350


aaa gat gag ctt ttt gtc ggc agc atc aag aca gtt ctc ggt cac acg       1104
Lys Asp Glu Leu Phe Val Gly Ser Ile Lys Thr Val Leu Gly His Thr
             355              360              365


gaa ggc act gct ggt att gcg ggc tta atg aag gca tcg ttt gct gta       1152
```

```
Glu Gly Thr Ala Gly Ile Ala Gly Leu Met Lys Ala Ser Phe Ala Val
    370               375               380


cga aat ggc gtg atc ccg cca aac ctg ctg ttt gag aag atc agt ccc    1200
Arg Asn Gly Val Ile Pro Pro Asn Leu Leu Phe Glu Lys Ile Ser Pro
385               390               395               400


cgt gtc gct ccg ttc tat acg cac ttg aaa att gca acg gag gcc aca    1248
Arg Val Ala Pro Phe Tyr Thr His Leu Lys Ile Ala Thr Glu Ala Thr
                405               410               415


gaa tgg ccg att gtt gcg ccc ggg cag cct cgc aga gtc agc gtt aat    1296
Glu Trp Pro Ile Val Ala Pro Gly Gln Pro Arg Arg Val Ser Val Asn
                420               425               430


tca ttt gga ttt ggt ggt aca aat gcc cat gct att atc gaa gag tat    1344
Ser Phe Gly Phe Gly Gly Thr Asn Ala His Ala Ile Ile Glu Glu Tyr
            435               440               445


atg gct cct cca cac aag ccg aca gca gtg gta aca gag gtg acc tca    1392
Met Ala Pro Pro His Lys Pro Thr Ala Val Val Thr Glu Val Thr Ser
    450               455               460


gat gca gat gca tgc agc ttg ccc ctt gtg ctt tca tcg aag tcg cag    1440
Asp Ala Asp Ala Cys Ser Leu Pro Leu Val Leu Ser Ser Lys Ser Gln
465               470               475               480


cgc tcc atg aag gca acg cta gaa aat atg ctc caa ttt ctg gaa acg    1488
Arg Ser Met Lys Ala Thr Leu Glu Asn Met Leu Gln Phe Leu Glu Thr
                485               490               495


cat gat gac gtg gac atg cat gat atc gca tat acc tta ctt gag aaa    1536
His Asp Asp Val Asp Met His Asp Ile Ala Tyr Thr Leu Leu Glu Lys
                500               505               510


cgg tct atc ttg ccc ttc cgt cgt gcg att gca gca cac aac aag gaa    1584
```

```
Arg Ser Ile Leu Pro Phe Arg Arg Ala Ile Ala Ala His Asn Lys Glu
        515             520             525


gta gcc cgc gcg gca ctg gag gct gcc atc gcg gac ggt gag gtc gtc        1632
Val Ala Arg Ala Ala Leu Glu Ala Ala Ile Ala Asp Gly Glu Val Val
        530             535             540


acc gac ttc cgc acc gac gcg aat gac aac cct cgc gta cta ggt gtc        1680
Thr Asp Phe Arg Thr Asp Ala Asn Asp Asn Pro Arg Val Leu Gly Val
545             550             555             560


ttt act ggc caa ggt gca cag tgg ccg ggc atg ctg aag aag ctc atg        1728
Phe Thr Gly Gln Gly Ala Gln Trp Pro Gly Met Leu Lys Lys Leu Met
            565             570             575


gtg ggt atg cca ttt gtg aga ggc att ctc gaa gag ctg gat aat tca        1776
Val Gly Met Pro Phe Val Arg Gly Ile Leu Glu Glu Leu Asp Asn Ser
            580             585             590


ctg caa aca ctg cct gaa aag tat cgg cct acg tgg aca ctg tat gac        1824
Leu Gln Thr Leu Pro Glu Lys Tyr Arg Pro Thr Trp Thr Leu Tyr Asp
        595             600             605


cag ctc atg ctt gaa ggg gat gcc tca aac gtc aga ctc gcc agc ttc        1872
Gln Leu Met Leu Glu Gly Asp Ala Ser Asn Val Arg Leu Ala Ser Phe
        610             615             620


tcc cag cct cta tgc tgc gcc gta caa atc gtt ctg gtc cga ctt ctc        1920
Ser Gln Pro Leu Cys Cys Ala Val Gln Ile Val Leu Val Arg Leu Leu
625             630             635             640


gct gca gct ggt atc gag ttc agt gca att gtc ggc cac agt tca ggt        1968
Ala Ala Ala Gly Ile Glu Phe Ser Ala Ile Val Gly His Ser Ser Gly
            645             650             655


gag att gcc tgt gcc ttt gcg gca gga ttc atc agt gcc act caa gct        2016
```

```
Glu Ile Ala Cys Ala Phe Ala Ala Gly Phe Ile Ser Ala Thr Gln Ala
        660                 665                 670


atc cgt att gcg cat ctg cgt gga gtt gtg tcc gcg gag cat gcc tct       2064
Ile Arg Ile Ala His Leu Arg Gly Val Val Ser Ala Glu His Ala Ser
        675                 680                 685


tct cca agc ggc cag aca ggc gct atg cta gcg gca ggt atg tcg tac       2112
Ser Pro Ser Gly Gln Thr Gly Ala Met Leu Ala Ala Gly Met Ser Tyr
        690                 695                 700


gat gac gca aag gaa cta tgc gag ctc gaa gcc ttt gag ggt cgg gtc       2160
Asp Asp Ala Lys Glu Leu Cys Glu Leu Glu Ala Phe Glu Gly Arg Val
705                 710                 715                 720


tgc gtc gcc gct agc aat tca ccg gat agt gtg acc ttc tcc ggc gac       2208
Cys Val Ala Ala Ser Asn Ser Pro Asp Ser Val Thr Phe Ser Gly Asp
                725                 730                 735


atg gat gct atc cag cac gtt gaa ggt gtc ttg gag gat gaa tcc act       2256
Met Asp Ala Ile Gln His Val Glu Gly Val Leu Glu Asp Glu Ser Thr
                740                 745                 750


ttt gcc aga atc ttg aga gtt gac aag gcc tac cat tcg cat cac atg       2304
Phe Ala Arg Ile Leu Arg Val Asp Lys Ala Tyr His Ser His His Met
        755                 760                 765


cac cca tgc gca gct cca tat gtc aag gca ttg ctg gag tgc gac tgt       2352
His Pro Cys Ala Ala Pro Tyr Val Lys Ala Leu Leu Glu Cys Asp Cys
        770                 775                 780


gct gtt gcc gat ggc caa ggt aac gat agt gtt gct tgg ttc tct gcc       2400
Ala Val Ala Asp Gly Gln Gly Asn Asp Ser Val Ala Trp Phe Ser Ala
785                 790                 795                 800


gtc cac gag acc agc aag caa atg act gta cag gat gtg atg ccc gct       2448
```

Val His Glu Thr Ser Lys Gln Met Thr Val Gln Asp Val Met Pro Ala
             805   810   815

tat tgg aaa gac aat ctc gtc tct ccg gtc ttg ttc tcg cag gct gtg   2496
Tyr Trp Lys Asp Asn Leu Val Ser Pro Val Leu Phe Ser Gln Ala Val
             820   825   830

cag aaa gca gtc atc act cat cgt cta atc gac gtc gcc atc gaa att   2544
Gln Lys Ala Val Ile Thr His Arg Leu Ile Asp Val Ala Ile Glu Ile
             835   840   845

ggc gcc cac cct gct ctc aag ggt ccg tgt cta gcc acc atc aag gat   2592
Gly Ala His Pro Ala Leu Lys Gly Pro Cys Leu Ala Thr Ile Lys Asp
             850   855   860

gct ctt gcc ggt gtg gag ctg ccg tat acc ggg tgc ttg gca cga aac   2640
Ala Leu Ala Gly Val Glu Leu Pro Tyr Thr Gly Cys Leu Ala Arg Asn
865   870   875   880

gtt gac gat gtg gac gct ttt gct gga ggt ctg gga tac att tgg gag   2688
Val Asp Asp Val Asp Ala Phe Ala Gly Gly Leu Gly Tyr Ile Trp Glu
             885   890   895

cgt ttc gga gtt cgg agt atc gac gcc gag ggc ttc gta caa caa gtc   2736
Arg Phe Gly Val Arg Ser Ile Asp Ala Glu Gly Phe Val Gln Gln Val
             900   905   910

cgg ccc gat cgt gcc gtt caa aac ctg tca aag tca ttg ccc aca tac   2784
Arg Pro Asp Arg Ala Val Gln Asn Leu Ser Lys Ser Leu Pro Thr Tyr
             915   920   925

tct tgg gat cat act cgt caa tac tgg gca gaa tct cgc tcc acc cgc   2832
Ser Trp Asp His Thr Arg Gln Tyr Trp Ala Glu Ser Arg Ser Thr Arg
             930   935   940

cag cat ctt cgt gga ggt gcg ccc cat ctt ctg ctt gga aag ctt tct   2880

Gln His Leu Arg Gly Gly Ala Pro His Leu Leu Leu Gly Lys Leu Ser
945   950   955   960

tct tac agc aca gca tcg acc ttc cag tgg aca aac ttc atc agg ccc   2928
Ser Tyr Ser Thr Ala Ser Thr Phe Gln Trp Thr Asn Phe Ile Arg Pro
                965   970   975

cgg gat ctg gaa tgg ctc gac ggt cat gcg cta caa ggc cag act gtg   2976
Arg Asp Leu Glu Trp Leu Asp Gly His Ala Leu Gln Gly Gln Thr Val
                980   985   990

ttc ccc gct gct ggg tac ata att atg gcc atg gaa gct gcc atg aag   3024
Phe Pro Ala Ala Gly Tyr Ile Ile Met Ala Met Glu Ala Ala Met Lys
            995   1000   1005

gtg gct ggt gag cgt gcc gcc caa gtt cag ctc ctg gaa atc ttg   3069
Val Ala Gly Glu Arg Ala Ala Gln Val Gln Leu Leu Glu Ile Leu
    1010   1015   1020

gac atg agc atc aac aaa gcc atc gtg ttt gaa gat gaa aac acc   3114
Asp Met Ser Ile Asn Lys Ala Ile Val Phe Glu Asp Glu Asn Thr
    1025   1030   1035

tcc gtg gag ctg aac ttg aca gcc gaa gtc acc agt gac aat gat   3159
Ser Val Glu Leu Asn Leu Thr Ala Glu Val Thr Ser Asp Asn Asp
    1040   1045   1050

gcg gat ggc caa gtc acg gtc aaa ttt gtt att gat tcc tgt ctg   3204
Ala Asp Gly Gln Val Thr Val Lys Phe Val Ile Asp Ser Cys Leu
    1055   1060   1065

gca aag gag agt gag ctt tcg aca tcc gcc aaa ggc caa atc gtc   3249
Ala Lys Glu Ser Glu Leu Ser Thr Ser Ala Lys Gly Gln Ile Val
    1070   1075   1080

ata acc ctt ggc gag gca tca ccg tca tcg cag ctt ttg ccg cca   · 3294

```
Ile Thr  Leu Gly Glu Ala Ser  Pro Ser Ser Gln Leu  Leu Pro Pro
    1085                1090                1095


cct gag  gaa gag tac ccc cag  atg aac aat gtc aac  atc gat ttc        3339
Pro Glu  Glu Glu Tyr Pro Gln  Met Asn Asn Val Asn  Ile Asp Phe
    1100                1105                1110


ttc tat  cgg gaa ctt gac ctc  ctt ggg tat gac tac  agc aaa gac        3384
Phe Tyr  Arg Glu Leu Asp Leu  Leu Gly Tyr Asp Tyr  Ser Lys Asp
    1115                1120                1125


ttc cgt  cgt ttg cag acc atg  aga agg gcc gac tcc  aaa gct agc        3429
Phe Arg  Arg Leu Gln Thr Met  Arg Arg Ala Asp Ser  Lys Ala Ser
    1130                1135                1140


ggc acc  ttg gct ttc ctt cca  ctt aag gat gaa ttg  cgc aat gag        3474
Gly Thr  Leu Ala Phe Leu Pro  Leu Lys Asp Glu Leu  Arg Asn Glu
    1145                1150                1155


ccc ctc  ttg ctc cac cca gcg  ccc ctg gac atc gcg  ttc cag act        3519
Pro Leu  Leu Leu His Pro Ala  Pro Leu Asp Ile Ala  Phe Gln Thr
    1160                1165                1170


gtc att  gga gcg tat tcc tct  cca gga gat cgt cgc  cta cgc tca        3564
Val Ile  Gly Ala Tyr Ser Ser  Pro Gly Asp Arg Arg  Leu Arg Ser
    1175                1180                1185


ttg tac  gtg cct act cac gtt  gac aga gtg act ctg  att cca tcg        3609
Leu Tyr  Val Pro Thr His Val  Asp Arg Val Thr Leu  Ile Pro Ser
    1190                1195                1200


ctc tgt  ata tcg gcg ggt aat  tct ggt gaa acc gag  ctt gcg ttt        3654
Leu Cys  Ile Ser Ala Gly Asn  Ser Gly Glu Thr Glu  Leu Ala Phe
    1205                1210                1215


gac aca  atc aac aca cac gac  aag ggt gat ttc ctg  agc ggc gac        3699
```

Asp Thr Ile Asn Thr His Asp Lys Gly Asp Phe Leu Ser Gly Asp
    1220   1225   1230

atc acg gtg tac gat tcg acc aag aca acg ctt ttc caa gtt gat   3744
Ile Thr Val Tyr Asp Ser Thr Lys Thr Thr Leu Phe Gln Val Asp
    1235   1240   1245

aac att gtc ttt aag cct ttc tct ccc ccg act gct tcg acc gac   3789
Asn Ile Val Phe Lys Pro Phe Ser Pro Pro Thr Ala Ser Thr Asp
    1250   1255   1260

cac cga atc ttc gca aag tgg gtc tgg gga ccc ctc acg ccc gaa   3834
His Arg Ile Phe Ala Lys Trp Val Trp Gly Pro Leu Thr Pro Glu
    1265   1270   1275

aaa ctg ctg gag gac cct gcg acg ttg atc ata gct cgg gac aag   3879
Lys Leu Leu Glu Asp Pro Ala Thr Leu Ile Ile Ala Arg Asp Lys
    1280   1285   1290

gag gac att ctg acc atc gag cga atc gtt tac ttc tac atc aaa   3924
Glu Asp Ile Leu Thr Ile Glu Arg Ile Val Tyr Phe Tyr Ile Lys
    1295   1300   1305

tcc ttc cta gcc cag ata acc ccc gac gac cgt caa aat gcc gac   3969
Ser Phe Leu Ala Gln Ile Thr Pro Asp Asp Arg Gln Asn Ala Asp
    1310   1315   1320

ctc cat tcc cag aag tac att gaa tgg tgt gac cag gtt cag gcc   4014
Leu His Ser Gln Lys Tyr Ile Glu Trp Cys Asp Gln Val Gln Ala
    1325   1330   1335

gat gct cgg gct ggc cac cat cag tgg tac cag gag tct tgg gag   4059
Asp Ala Arg Ala Gly His His Gln Trp Tyr Gln Glu Ser Trp Glu
    1340   1345   1350

gag gac act tct gtt cac att gag caa atg tgt gaa agc aac tcg   4104

Glu Asp Thr Ser Val His Ile Glu Gln Met Cys Glu Ser Asn Ser
    1355   1360   1365

tcc cac cca cat gtg cgc ctg atc caa agg gta ggc aaa gaa tta   4149
Ser His Pro His Val Arg Leu Ile Gln Arg Val Gly Lys Glu Leu
    1370   1375   1380

att tca att gtt cgc ggg aac ggg gat cct ttg gat atc atg aac   4194
Ile Ser Ile Val Arg Gly Asn Gly Asp Pro Leu Asp Ile Met Asn
    1385   1390   1395

cgc gat ggg ttg ttc acc gag tac tat acc aac aag ctc gcc ttt   4239
Arg Asp Gly Leu Phe Thr Glu Tyr Tyr Thr Asn Lys Leu Ala Phe
    1400   1405   1410

ggc tca gca ata cac gtc gtt cag gat ctg gtt agc caa att gct   4284
Gly Ser Ala Ile His Val Val Gln Asp Leu Val Ser Gln Ile Ala
    1415   1420   1425

cat cgc tac caa tcc att gat atc ctt gag atc ggc ttg ggt aca   4329
His Arg Tyr Gln Ser Ile Asp Ile Leu Glu Ile Gly Leu Gly Thr
    1430   1435   1440

ggc atc gcc acg aag cgc gtt ctt gca tca cct caa ctt ggt ttc   4374
Gly Ile Ala Thr Lys Arg Val Leu Ala Ser Pro Gln Leu Gly Phe
    1445   1450   1455

aac agt tac act tgc act gac atc tcg gcg gat gtt att ggc aag   4419
Asn Ser Tyr Thr Cys Thr Asp Ile Ser Ala Asp Val Ile Gly Lys
    1460   1465   1470

gcc cgt gaa caa ctt tcc gaa ttc gac ggt ctc atg cag ttt gag   4464
Ala Arg Glu Gln Leu Ser Glu Phe Asp Gly Leu Met Gln Phe Glu
    1475   1480   1485

gca cta gac atc aac aga agc cca gca gag caa gga ttc aag cct   4509

```
        Ala Leu  Asp Ile Asn Arg Ser  Pro Ala Glu Gln Gly  Phe Lys Pro
            1490                1495                1500


        cac tcc  tac gat ctg att att  gca tcc gat gtc ctc  cat gcc agc        4554
        His Ser  Tyr Asp Leu Ile Ile  Ala Ser Asp Val Leu  His Ala Ser
            1505                1510                1515


        tcc aac  ttc gag gaa aaa ttg  gct cac ata agg tcc  ttg ctc aag        4599
        Ser Asn  Phe Glu Glu Lys Leu  Ala His Ile Arg Ser  Leu Leu Lys
            1520                1525                1530


        ccg ggt  ggt cac ttg gtt act  ttc ggg gtc acc cat  cgc gag cct        4644
        Pro Gly  Gly His Leu Val Thr  Phe Gly Val Thr His  Arg Glu Pro
            1535                1540                1545


        gct cgc  ctc gcc ttc atc tct  ggg ctt ttc gct gat  cga tgg act        4689
        Ala Arg  Leu Ala Phe Ile Ser  Gly Leu Phe Ala Asp  Arg Trp Thr
            1550                1555                1560


        gga gaa  gac gaa act cgt gct  ttg agt gcc tcg ggg  tcc gtt gac        4734
        Gly Glu  Asp Glu Thr Arg Ala  Leu Ser Ala Ser Gly  Ser Val Asp
            1565                1570                1575


        caa tgg  gag cat acc ctc aag  aga gtt ggg ttc tct  ggc gtc gat        4779
        Gln Trp  Glu His Thr Leu Lys  Arg Val Gly Phe Ser  Gly Val Asp
            1580                1585                1590


        agt cgg  aca ctt gat cga gag  gat gat ttg atc ccg  tct gtc ttc        4824
        Ser Arg  Thr Leu Asp Arg Glu  Asp Asp Leu Ile Pro  Ser Val Phe
            1595                1600                1605


        agt aca  cat gct gtg gat gcc  acc gtt gag cgt ttg  tat gat cca        4869
        Ser Thr  His Ala Val Asp Ala  Thr Val Glu Arg Leu  Tyr Asp Pro
            1610                1615                1620


        ctt tct  gct cca ttg aag gac  tca tac ccg cca tta  gtg gtt atc        4914
```

```
Leu Ser  Ala Pro Leu Lys Asp  Ser Tyr Pro Pro Leu  Val Val Ile
    1625             1630             1635


ggt ggc  gaa tcg aca aaa acc  gaa cgc att ttg aac  gac atg aaa      4959
Gly Gly  Glu Ser Thr Lys Thr  Glu Arg Ile Leu Asn  Asp Met Lys
    1640             1645             1650


gct gcc  cta ccg cat aga cac  atc cac tcc gtc aag  cgg ctg gaa      5004
Ala Ala  Leu Pro His Arg His  Ile His Ser Val Lys  Arg Leu Glu
    1655             1660             1665


agt gtt  ctc gac gac ccg gcc  ttg cag cct aag tcg  act ttt gtc      5049
Ser Val  Leu Asp Asp Pro Ala  Leu Gln Pro Lys Ser  Thr Phe Val
    1670             1675             1680


atc ctc  tcg gaa ctt gat gat  gaa gtg ttt tgc aac  ctt gaa gag      5094
Ile Leu  Ser Glu Leu Asp Asp  Glu Val Phe Cys Asn  Leu Glu Glu
    1685             1690                  1695


gac aag  ttt gag gca gtc aag  tct ctt ctc ttc tac  gcc gga cgc      5139
Asp Lys  Phe Glu Ala Val Lys  Ser Leu Leu Phe Tyr  Ala Gly Arg
    1700             1705             1710


atg atg  tgg ctg aca gag aat  gcc tgg att gat cat  ccc cac cag      5184
Met Met  Trp Leu Thr Glu Asn  Ala Trp Ile Asp His  Pro His Gln
    1715             1720              1725


gcc agc  acc atc gga atg ttg  agg aca atc aag ctc  gag aac cct      5229
Ala Ser  Thr Ile Gly Met Leu  Arg Thr Ile Lys Leu  Glu Asn Pro
    1730             1735             1740


gac ttg  gga acg cac gtc ttc  gat gtc gat act gtg  gag aac cta      5274
Asp Leu  Gly Thr His Val Phe  Asp Val Asp Thr Val  Glu Asn Leu
    1745             1750             1755


gac acc  aaa ttc ttc gtt gag  caa ctt ttg cgc ttc  gag gag agc      5319
```

Asp Thr Lys Phe Phe Val Glu Gln Leu Leu Arg Phe Glu Glu Ser
     1760   1765   1770

gat gat cag ctt ttg gaa tca ata aca tgg act cat gag ccc gaa   5364
Asp Asp Gln Leu Leu Glu Ser Ile Thr Trp Thr His Glu Pro Glu
     1775   1780   1785

gtg tac tgg tgc aag ggt cgt gcc tgg gtc cct cgt ttg aag cag   5409
Val Tyr Trp Cys Lys Gly Arg Ala Trp Val Pro Arg Leu Lys Gln
     1790   1795   1800

gat att gct agg aac gac cgt atg aac tcg tct cgt cgt cca att   5454
Asp Ile Ala Arg Asn Asp Arg Met Asn Ser Ser Arg Arg Pro Ile
     1805   1810   1815

ttc ggt aac ttt aat tcg tcc aag acg gcc att gca ctg aaa gag   5499
Phe Gly Asn Phe Asn Ser Ser Lys Thr Ala Ile Ala Leu Lys Glu
     1820   1825   1830

gcg agg gga gca tcc tca tcg atg tac tat ctt gag tca acc gag   5544
Ala Arg Gly Ala Ser Ser Ser Met Tyr Tyr Leu Glu Ser Thr Glu
     1835   1840   1845

acg tgt gat tcg tta gaa gac gct cgt cat gct gga aaa gca act   5589
Thr Cys Asp Ser Leu Glu Asp Ala Arg His Ala Gly Lys Ala Thr
     1850   1855   1860

gtt cgt gtt cgc tac gct ctt ccc cag gca att cgc gtg ggc cat   5634
Val Arg Val Arg Tyr Ala Leu Pro Gln Ala Ile Arg Val Gly His
     1865   1870   1875

ctc gga tac ttc cat gtc gtg cag ggc agt att ctg gag aat aca   5679
Leu Gly Tyr Phe His Val Val Gln Gly Ser Ile Leu Glu Asn Thr
     1880   1885   1890

tgt gag gtg cct gta gtc gcc ctg gct gag aag aat gga tct ata   5724

```
Cys Glu  Val Pro Val Val Ala  Leu Ala Glu Lys Asn  Gly Ser Ile
    1895          1900          1905


ctg cat  gta ccg aga aac tac  atg cat agt ctg ccc  gat aac atg     5769
Leu His  Val Pro Arg Asn Tyr  Met His Ser Leu Pro  Asp Asn Met
    1910          1915          1920


gcg gaa  ggc gag gat agt tcc  ttc ttg ttg tcc aca  gct gca gcc     5814
Ala Glu  Gly Glu Asp Ser Ser  Phe Leu Leu Ser Thr  Ala Ala Ala
    1925          1930          1935


ctc ctt  gcc gaa aca att ctc  tct agc gct cag tcc  ttt ggc tct     5859
Leu Leu  Ala Glu Thr Ile Leu  Ser Ser Ala Gln Ser  Phe Gly Ser
    1940          1945          1950


gat gca  tca att ctg att atg  gag ccc cca atc ttc  tgc gtc aaa     5904
Asp Ala  Ser Ile Leu Ile Met  Glu Pro Pro Ile Phe  Cys Val Lys
    1955          1960          1965


gca att  ctg gag tcg gcc aaa  acc tac ggt gtt cag  gtt cat ttg     5949
Ala Ile  Leu Glu Ser Ala Lys  Thr Tyr Gly Val Gln  Val His Leu
    1970          1975          1980


gca aca  act ctg tcc gac gtc  aaa act att ccg gct  cct tgg atc     5994
Ala Thr  Thr Leu Ser Asp Val  Lys Thr Ile Pro Ala  Pro Trp Ile
    1985          1990          1995


cga tta  cat gcc aag gaa acc  gac gct cgg ctg aaa  cac agc ctg     6039
Arg Leu  His Ala Lys Glu Thr  Asp Ala Arg Leu Lys  His Ser Leu
    2000          2005          2010


ccg aca  aac atg atg gca ttc  ttt gac ttg tct acc  gac cgg act     6084
Pro Thr  Asn Met Met Ala Phe  Phe Asp Leu Ser Thr  Asp Arg Thr
    2015          2020          2025


gct gcc  ggg ata acc aac cgt  ttg gcc aag ttg cta  cca ccc agt     6129
```

```
Ala Ala  Gly Ile Thr Asn Arg  Leu Ala Lys Leu Leu  Pro Pro Ser
    2030                2035                2040


tgc ttc  atg tac agt ggt gac  tat ctt atc cga agt  aca gct tcc        6174
Cys Phe  Met Tyr Ser Gly Asp  Tyr Leu Ile Arg Ser  Thr Ala Ser
    2045                2050                2055


aca tac  aaa gtt agt cat gtt  gag gat att cca atc  ctc gag cac        6219
Thr Tyr  Lys Val Ser His Val  Glu Asp Ile Pro Ile  Leu Glu His
    2060                2065                2070


tct gtg  gca atg gca aaa aat  acc gtc tct gcg tcg  act gtc gac        6264
Ser Val  Ala Met Ala Lys Asn  Thr Val Ser Ala Ser  Thr Val Asp
    2075                2080                2085


gac act  gag aaa gtt att aca  gcc aca caa att ctc  ttg cct ggt        6309
Asp Thr  Glu Lys Val Ile Thr  Ala Thr Gln Ile Leu  Leu Pro Gly
    2090                2095                2100


cag ctc  tct gtc aac cac aat  gac caa cgc ttc aat  ctg gcc acc        6354
Gln Leu  Ser Val Asn His Asn  Asp Gln Arg Phe Asn  Leu Ala Thr
    2105                2110                2115


gtc atc  gac tgg aag gaa aat  gag gtg tcc gct agg  att tgc ccc        6399
Val Ile  Asp Trp Lys Glu Asn  Glu Val Ser Ala Arg  Ile Cys Pro
    2120                2125                2130


atc gac  tct ggt aac tta ttt  tcc aac aag aag acg  tat ttg ctt        6444
Ile Asp  Ser Gly Asn Leu Phe  Ser Asn Lys Lys Thr  Tyr Leu Leu
    2135                2140                2145


gtt ggt  ctt acc ggg gac ctt  ggt cgc tct ctc tgt  cgc tgg atg        6489
Val Gly  Leu Thr Gly Asp Leu  Gly Arg Ser Leu Cys  Arg Trp Met
    2150                2155                2160


atc ttg  cat ggc gcc cgc cat  gtt gtg ctc act agc  cgg aac cct        6534
```

```
Ile Leu  His Gly Ala Arg His  Val Val Leu Thr Ser  Arg Asn Pro
    2165               2170               2175


cga ctt  gat ccc aaa tgg atc  gcc aac atg gag gca  ctt ggt ggt        6579
Arg Leu  Asp Pro Lys Trp Ile  Ala Asn Met Glu Ala  Leu Gly Gly
    2180               2185               2190


gac atc  acc gtt ctg tca atg  gat gtt gcc aat gag  gat tca gtc        6624
Asp Ile  Thr Val Leu Ser Met  Asp Val Ala Asn Glu  Asp Ser Val
    2195               2200               2205


gat gct  ggc ctt ggc aag ctt  gtc gat atg aag ttg  cca cct gtt        6669
Asp Ala  Gly Leu Gly Lys Leu  Val Asp Met Lys Leu  Pro Pro Val
    2210               2215               2220


gcc ggc  atc gcg ttc ggg cct  ttg gtg ctg cag gat  gtc atg ctg        6714
Ala Gly  Ile Ala Phe Gly Pro  Leu Val Leu Gln Asp  Val Met Leu
    2225               2230               2235


aag aac  atg gac cac cag atg  atg gac atg gtg ttg  aag ccc aag        6759
Lys Asn  Met Asp His Gln Met  Met Asp Met Val Leu  Lys Pro Lys
    2240               2245               2250


gta caa  gga gca cgc att ctt  cat gaa cgg ttc tcc  gaa cag acg        6804
Val Gln  Gly Ala Arg Ile Leu  His Glu Arg Phe Ser  Glu Gln Thr
    2255               2260               2265


ggc agc  aag gcg ctc gac ttc  ttc atc atg ttt tcg  tcc att gtt        6849
Gly Ser  Lys Ala Leu Asp Phe  Phe Ile Met Phe Ser  Ser Ile Val
    2270               2275               2280


gca gtt  att ggc aat cct ggc  cag tcc aac tat ggc  gct gcg aat        6894
Ala Val  Ile Gly Asn Pro Gly  Gln Ser Asn Tyr Gly  Ala Ala Asn
    2285               2290               2295


gcc tac  cta cag gct ctg gcc  cag caa cgg tgc gcc  aga gga ttg        6939
```

Ala Tyr Leu Gln Ala Leu Ala Gln Gln Arg Cys Ala Arg Gly Leu
    2300   2305   2310

gcg gga tca acc atc gat att ggt gcc gtt tac ggt gta ggg ttt   6984
Ala Gly Ser Thr Ile Asp Ile Gly Ala Val Tyr Gly Val Gly Phe
    2315   2320   2325

gtc acg agg gcc gag atg gag gag gac ttt gat gct atc cgt ttc   7029
Val Thr Arg Ala Glu Met Glu Glu Asp Phe Asp Ala Ile Arg Phe
    2330   2335   2340

atg ttt gac tca gtt gaa gag cat gag ctg cac acg ctt ttc gcc   7074
Met Phe Asp Ser Val Glu Glu His Glu Leu His Thr Leu Phe Ala
    2345   2350   2355

gaa gcg gtc gtg tct gac cag cgt gcc cgg cag caa cca cag cgc   7119
Glu Ala Val Val Ser Asp Gln Arg Ala Arg Gln Gln Pro Gln Arg
    2360   2365   2370

aag acg gtc att gac atg gcg gac ctt gag ctt acc acg ggt atc   7164
Lys Thr Val Ile Asp Met Ala Asp Leu Glu Leu Thr Thr Gly Ile
    2375   2380   2385

cca gat ctt gac cct gcg ctt caa gat cga att att tac ttc aac   7209
Pro Asp Leu Asp Pro Ala Leu Gln Asp Arg Ile Ile Tyr Phe Asn
    2390   2395   2400

gac cct cgt ttc gga aac ttc aaa att ccc ggt caa cgc gga gac   7254
Asp Pro Arg Phe Gly Asn Phe Lys Ile Pro Gly Gln Arg Gly Asp
    2405   2410   2415

ggt ggc gac aat gga tca ggg tct aaa ggc tcc att gcc gac cag   7299
Gly Gly Asp Asn Gly Ser Gly Ser Lys Gly Ser Ile Ala Asp Gln
    2420   2425   2430

ctc aaa caa gca aca act tta gac caa gtt cgg caa atc gtg att   7344

Leu Lys Gln Ala Thr Thr Leu Asp Gln Val Arg Gln Ile Val Ile
    2435   2440   2445

gat ggt cta tct gag aaa ctc cgt gtt acc ctc caa gtt tcg gac   7389
Asp Gly Leu Ser Glu Lys Leu Arg Val Thr Leu Gln Val Ser Asp
    2450   2455   2460

ggg gag agc gtg gac cca acc att cct ctc att gat caa ggt gtc   7434
Gly Glu Ser Val Asp Pro Thr Ile Pro Leu Ile Asp Gln Gly Val
    2465   2470   2475

gac tcc ttg ggt gca gtg act gtc ggc tca tgg ttc tca aag caa   7479
Asp Ser Leu Gly Ala Val Thr Val Gly Ser Trp Phe Ser Lys Gln
    2480   2485   2490

ctc tac ctt gac ctc cca ctc ttg agg gta ctt ggc ggt gct tct   7524
Leu Tyr Leu Asp Leu Pro Leu Leu Arg Val Leu Gly Gly Ala Ser
    2495   2500   2505

gtc gct gat ctt gcc gac gac gcg gcc acc cga ctc cca gct aca   7569
Val Ala Asp Leu Ala Asp Asp Ala Ala Thr Arg Leu Pro Ala Thr
    2510   2515   2520

tcc att ccg ctg ctg ttg caa att ggt gat tcc acg gga acc tcg   7614
Ser Ile Pro Leu Leu Leu Gln Ile Gly Asp Ser Thr Gly Thr Ser
    2525   2530   2535

gac agc ggg gct tct ccg aca cca aca gac agc cat gat gaa gca .   7659
Asp Ser Gly Ala Ser Pro Thr Pro Thr Asp Ser His Asp Glu Ala
  · 2540   2545   2550

agc tct gct acc agc aca gat gcg tcg tca gcc gaa gag gat gaa   7704
Ser Ser Ala Thr Ser Thr Asp Ala Ser Ser Ala Glu Glu Asp Glu
    2555   2560   2565

gag caa gag gac gat aat gag cag gga ggc cgt aag att ctt cgt   7749

```
Glu Gln  Glu Asp Asp Asn Glu  Gln Gly Gly Arg Lys  Ile Leu Arg
    2570             2575             2580


cgc gag  agg ttg tcc ctt ggc  cag gag tat tcc tgg  agg cag caa    7794
Arg Glu  Arg Leu Ser Leu Gly  Gln Glu Tyr Ser Trp  Arg Gln Gln
    2585             2590             2595


caa atg  gta aaa gat cat acc  atc ttc aac aac act  att ggc atg    7839
Gln Met  Val Lys Asp His Thr  Ile Phe Asn Asn Thr  Ile Gly Met
    2600             2605             2610


ttc atg  aag ggt acc att gac  ctc gac cgg ttg agg  cgg gct ctg    7884
Phe Met  Lys Gly Thr Ile Asp  Leu Asp Arg Leu Arg  Arg Ala Leu
    2615             2620             2625


aaa gcc  tca ttg cgc cgt cac  gag atc ttc cgt acg  tgc ttt gtt    7929
Lys Ala  Ser Leu Arg Arg His  Glu Ile Phe Arg Thr  Cys Phe Val
    2630             2635             2640


act ggc  gat gac tat agc agc  gat tta aat ggt ccc  gtc caa gtg    7974
Thr Gly  Asp Asp Tyr Ser Ser  Asp Leu Asn Gly Pro  Val Gln Val
    2645             2650             2655


gtt ctc  aag aac ccg gag aac  aga gtg cac ttt gtt  cag gtg aac    8019
Val Leu  Lys Asn Pro Glu Asn  Arg Val His Phe Val  Gln Val Asn
    2660             2665             2670


aac gct  gcg gag gca gag gaa  gag tac cgg aaa ctc  gag aag aca    8064
Asn Ala  Ala Glu Ala Glu Glu  Glu Tyr Arg Lys Leu  Glu Lys Thr
    2675             2680             2685


aac tat  agc atc tcc aca ggt  gac act ctc aga ctc  gtt gat ttc    8109
Asn Tyr  Ser Ile Ser Thr Gly  Asp Thr Leu Arg Leu  Val Asp Phe
    2690             2695             2700


tac tgg  ggc aca gat gac cac  ctg ttg gta atc ggc  tac cac aga    8154
```

Tyr Trp Gly Thr Asp Asp His Leu Leu Val Ile Gly Tyr His Arg
    2705   2710   2715

tta gtt ggt gat ggc tca aca aca gaa aac ctg ttc aat gag atc   8199
Leu Val Gly Asp Gly Ser Thr Thr Glu Asn Leu Phe Asn Glu Ile
    2720   2725   2730

ggg cag att tac agc ggg gtg aaa atg cag cga cca tcg acc caa   8244
Gly Gln Ile Tyr Ser Gly Val Lys Met Gln Arg Pro Ser Thr Gln
    2735   2740   2745

ttc tct gat cta gcc gtc caa cag cgg gaa aac ctg gaa aat ggg   8289
Phe Ser Asp Leu Ala Val Gln Gln Arg Glu Asn Leu Glu Asn Gly
    2750   2755   2760

cga atg ggg gac gat atc gcg ttc tgg aag tcc atg cat agc aaa   8334
Arg Met Gly Asp Asp Ile Ala Phe Trp Lys Ser Met His Ser Lys
    2765   2770   2775

gtc tcg tca tct gcg cca acc gtg ctt ccc atc atg aat ctg atc   8379
Val Ser Ser Ser Ala Pro Thr Val Leu Pro Ile Met Asn Leu Ile
    2780   2785   2790

aat gac cct gct gcc aat tca gag cag cag caa ata cag cca ttc   8424
Asn Asp Pro Ala Ala Asn Ser Glu Gln Gln Gln Ile Gln Pro Phe
    2795   2800   2805

acg tgg cag cag tat gaa gca att gct cgt tta gat ccc atg gtc   8469
Thr Trp Gln Gln Tyr Glu Ala Ile Ala Arg Leu Asp Pro Met Val
    2810   2815   2820

gcc ttc cga atc aaa gag cgg agc cgc aag cac aag gca acc ccc   8514
Ala Phe Arg Ile Lys Glu Arg Ser Arg Lys His Lys Ala Thr Pro
    2825   2830   2835

atg cag ttc tac ctg gcc gcc tac cac gtt ttg ttg gcg cgt ctt   8559

```
Met Gln  Phe Tyr Leu Ala Ala  Tyr His Val Leu Leu  Ala Arg Leu
    2840             2845             2850


acc ggc  agc aaa gac ata acc  atc ggc ctc gcc gaa  acc aac cga      8604
Thr Gly  Ser Lys Asp Ile Thr  Ile Gly Leu Ala Glu  Thr Asn Arg
    2855             2860             2865


tcc acc  atg gaa gaa att tcg  gcg atg ggc ttt ttc  gct aac gtg      8649
Ser Thr  Met Glu Glu Ile Ser  Ala Met Gly Phe Phe  Ala Asn Val
    2870             2875             2880


ctt ccc  ctg cgc ttt gat gag  ttc gtc ggc agc aag  aca ttc ggc      8694
Leu Pro  Leu Arg Phe Asp Glu  Phe Val Gly Ser Lys  Thr Phe Gly
    2885             2890             2895


gag cac  ctt gta gcc acc aag  gac agt gtg cgt gag  gcc atg caa      8739
Glu His  Leu Val Ala Thr Lys  Asp Ser Val Arg Glu  Ala Met Gln
    2900             2905             2910


cac gcg  cgg gtg ccg tat ggc  gtc atc ctc gac tgt  cta ggc ctg      8784
His Ala  Arg Val Pro Tyr Gly  Val Ile Leu Asp Cys  Leu Gly Leu
    2915             2920             2925


aat ctc  cct acc tca ggc gag  gaa ccc aag act cag  aca cac gcc      8829
Asn Leu  Pro Thr Ser Gly Glu  Glu Pro Lys Thr Gln  Thr His Ala
    2930             2935             2940


ccc ttg  ttc cag gct gtc ttt  gat tac aag cag ggt  caa gcg gag      8874
Pro Leu  Phe Gln Ala Val Phe  Asp Tyr Lys Gln Gly  Gln Ala Glu
    2945             2950             2955


agt ggc  tca att ggc aat gcc  aaa atg acg agt gtt  ctc gct tcc      8919
Ser Gly  Ser Ile Gly Asn Ala  Lys Met Thr Ser Val  Leu Ala Ser
    2960             2965             2970


cgt gag  cgc act cct tat gac  atc gtt ctc gag atg  tgg gat gac      8964
```

```
Arg Glu  Arg Thr Pro Tyr Asp  Ile Val Leu Glu Met  Trp Asp Asp
    2975              2980              2985


cct acc  aag gac cca ctc att  cat gtc aaa ctt cag  agc tcg ctg        9009
Pro Thr  Lys Asp Pro Leu Ile  His Val Lys Leu Gln  Ser Ser Leu
    2990              2995              3000


tat ggc  cct gag cac gct cag  gcc ttt gta gac cac  ttt tct tca        9054
Tyr Gly  Pro Glu His Ala Gln  Ala Phe Val Asp His  Phe Ser Ser
    3005              3010              3015


atc ctc  act atg ttc tcg atg  aac ccg gct ctg aag  ttg gcc tag        9099
Ile Leu  Thr Met Phe Ser Met  Asn Pro Ala Leu Lys  Leu Ala
    3020              3025              3030
```

<210> 44
<211> 3032
<212> PRT
<213> Penicillium citrinum

<400> 44

```
Met Asp Gln Ala Asn Tyr Pro Asn Glu Pro Ile Val Val Val Gly Ser
1               5               10              15


Gly Cys Arg Phe Pro Gly Gly Val Asn Thr Pro Ser Lys Leu Trp Glu
            20              25              30


Leu Leu Lys Glu Pro Arg Asp Val Gln Thr Lys Ile Pro Lys Glu Arg
        35              40              45


Phe Asp Val Asp Thr Phe Tyr Ser Pro Asp Gly Thr His Pro Gly Arg
```

50   55   60

Thr Asn Ala Pro Phe Ala Tyr Leu Leu Gln Glu Asp Leu Arg Gly Phe
65   70   75   80

Asp Ala Ser Phe Phe Asn Ile Gln Ala Gly Glu Ala Glu Thr Ile Asp
                85   90   95

Pro Gln Gln Arg Leu Leu Leu Glu Thr Val Tyr Glu Ala Val Ser Asn
              100   105   110

Ala Gly Leu Arg Ile Gln Gly Leu Gln Gly Ser Ser Thr Ala Val Tyr
            115   120   125

Val Gly Met Met Thr His Asp Tyr Glu Thr Ile Val Thr Arg Glu Leu
          130   135   140

Asp Ser Ile Pro Thr Tyr Ser Ala Thr Gly Val Ala Val Ser Val Ala
145   150   155   160

Ser Asn Arg Val Ser Tyr Phe Phe Asp Trp His Gly Pro Ser Met Thr
                  165   170   175

Ile Asp Thr Ala Cys Ser Ser Ser Leu Ala Ala Val His Leu Ala Val
                  180   185   190

Gln Gln Leu Arg Thr Gly Glu Ser Thr Met Ala Val Ala Ala Gly Ala

195   200   205

Asn Leu Ile Leu Gly Pro Met Thr Phe Val Met Glu Ser Lys Leu Asn
        210   215   220

Met Leu Ser Pro Asn Gly Arg Ser Arg Met Trp Asp Ala Ala Ala Asp
225   230   235   240

Gly Tyr Ala Arg Gly Glu Gly Val Cys Ser Ile Val Leu Lys Thr Leu
                245   250   255

Ser Gln Ala Leu Arg Asp Gly Asp Ser Ile Glu Cys Val Ile Arg Glu
                260   265   270

Thr Gly Ile Asn Gln Asp Gly Arg Thr Thr Gly Ile Thr Met Pro Asn
                275   280   285

His Ser Ala Gln Glu Ala Leu Ile Arg Ala Thr Tyr Ala Lys Ala Gly
        290   295   300

Leu Asp Ile Thr Asn Pro Gln Glu Arg Cys Gln Phe Phe Glu Ala His
305   310   315   320

Gly Thr Gly Thr Pro Ala Gly Asp Pro Gln Glu Ala Glu Ala Ile Ala
                325   330   335

Thr Ala Phe Phe Gly His Lys Asp Gly Thr Ile Asp Ser Asp Gly Glu

340   345   350

        Lys Asp Glu Leu Phe Val Gly Ser Ile Lys Thr Val Leu Gly His Thr
                355   360   365

        Glu Gly Thr Ala Gly Ile Ala Gly Leu Met Lys Ala Ser Phe Ala Val .
             370   375   380

        Arg Asn Gly Val Ile Pro Pro Asn Leu Leu Phe Glu Lys Ile Ser Pro
        385   390   395   400

        Arg Val Ala Pro Phe Tyr Thr His Leu Lys Ile Ala Thr Glu Ala Thr
                        405   410   415

        Glu Trp Pro Ile Val Ala Pro Gly Gln Pro Arg Arg Val Ser Val Asn
                        420   425   430

        Ser Phe Gly Phe Gly Gly Thr Asn Ala His Ala Ile Ile Glu Glu Tyr
                435   440   .   445

        Met Ala Pro Pro His Lys Pro Thr Ala Val Val Thr Glu Val Thr Ser
                450   455   460

        Asp Ala Asp Ala Cys Ser Leu Pro Leu Val Leu Ser Ser Lys Ser Gln
        465   470   475   480

        Arg Ser Met Lys Ala Thr Leu Glu Asn Met Leu Gln Phe Leu Glu Thr

His Asp Asp Val Asp Met His Asp Ile Ala Tyr Thr Leu Leu Glu Lys
          500   505   510

Arg Ser Ile Leu Pro Phe Arg Arg Ala Ile Ala Ala His Asn Lys Glu
          515   520   525

Val Ala Arg Ala Ala Leu Glu Ala Ala Ile Ala Asp Gly Glu Val Val
          530   535   540

Thr Asp Phe Arg Thr Asp Ala Asn Asp Asn Pro Arg Val Leu Gly Val
545   550   555   560

Phe Thr Gly Gln Gly Ala Gln Trp Pro Gly Met Leu Lys Lys Leu Met
          565   570   575

Val Gly Met Pro Phe Val Arg Gly Ile Leu Glu Glu Leu Asp Asn Ser
          580   585   590

Leu Gln Thr Leu Pro Glu Lys Tyr Arg Pro Thr Trp Thr Leu Tyr Asp
          595   600   605

Gln Leu Met Leu Glu Gly Asp Ala Ser Asn Val Arg Leu Ala Ser Phe
          610   615   620

Ser Gln Pro Leu Cys Cys Ala Val Gln Ile Val Leu Val Arg Leu Leu

Ala Ala Ala Gly Ile Glu Phe Ser Ala Ile Val Gly His Ser Ser Gly
            645   650   655

Glu Ile Ala Cys Ala Phe Ala Ala Gly Phe Ile Ser Ala Thr Gln Ala
            660   665   670

Ile Arg Ile Ala His Leu Arg Gly Val Val Ser Ala Glu His Ala Ser
            675   680   685

Ser Pro Ser Gly Gln Thr Gly Ala Met Leu Ala Ala Gly Met Ser Tyr
        690   695   700

Asp Asp Ala Lys Glu Leu Cys Glu Leu Glu Ala Phe Glu Gly Arg Val
705   710   715   720

Cys Val Ala Ala Ser Asn Ser Pro Asp Ser Val Thr Phe Ser Gly Asp
                725   730   735

Met Asp Ala Ile Gln His Val Glu Gly Val Leu Glu Asp Glu Ser Thr
            740   745   750

Phe Ala Arg Ile Leu Arg Val Asp Lys Ala Tyr His Ser His His Met
            755   760   765

His Pro Cys Ala Ala Pro Tyr Val Lys Ala Leu Leu Glu Cys Asp Cys

Ala Val Ala Asp Gly Gln Gly Asn Asp Ser Val Ala Trp Phe Ser Ala
785 790 795 800

Val His Glu Thr Ser Lys Gln Met Thr Val Gln Asp Val Met Pro Ala
805 810 815

Tyr Trp Lys Asp Asn Leu Val Ser Pro Val Leu Phe Ser Gln Ala Val
820 825 830

Gln Lys Ala Val Ile Thr His Arg Leu Ile Asp Val Ala Ile Glu Ile
835 840 845

Gly Ala His Pro Ala Leu Lys Gly Pro Cys Leu Ala Thr Ile Lys Asp
850 855 860

Ala Leu Ala Gly Val Glu Leu Pro Tyr Thr Gly Cys Leu Ala Arg Asn
865 870 875 880

Val Asp Asp Val Asp Ala Phe Ala Gly Gly Leu Gly Tyr Ile Trp Glu
885 890 895

Arg Phe Gly Val Arg Ser Ile Asp Ala Glu Gly Phe Val Gln Gln Val
900 905 910

Arg Pro Asp Arg Ala Val Gln Asn Leu Ser Lys Ser Leu Pro Thr Tyr

Ser Trp Asp His Thr Arg Gln Tyr Trp Ala Glu Ser Arg Ser Thr Arg
    930   935   940

Gln His Leu Arg Gly Gly Ala Pro His Leu Leu Leu Gly Lys Leu Ser
945   950   955   960

Ser Tyr Ser Thr Ala Ser Thr Phe Gln Trp Thr Asn Phe Ile Arg Pro
              965   970   975

Arg Asp Leu Glu Trp Leu Asp Gly His Ala Leu Gln Gly Gln Thr Val
          980   985   990

Phe Pro Ala Ala Gly Tyr Ile Ile Met Ala Met Glu Ala Ala Met Lys
        995   1000   1005

Val Ala Gly Glu Arg Ala Ala Glr Val Gln Leu Leu Glu Ile Leu
    1010   1015   1020

Asp Met Ser Ile Asn Lys Ala Ile Val Phe Glu Asp Glu Asn Thr
    1025   1030   1035

Ser Val Glu Leu Asn Leu Thr Ala Glu Val Thr Ser Asp Asn Asp
    1040   1045   1050

Ala Asp Gly Gln Val Thr Val Lys Phe Val Ile Asp Ser Cys Leu

Ala Lys Glu Ser Glu Leu Ser Thr Ser Ala Lys Gly Gln Ile Val
    1070   1075   1080

Ile Thr Leu Gly Glu Ala Ser Pro Ser Ser Gln Leu Leu Pro Pro
    1085   1090   1095

Pro Glu Glu Glu Tyr Pro Gln Met Asn Asn Val Asn Ile Asp Phe
    1100   1105   1110

Phe Tyr Arg Glu Leu Asp Leu Leu Gly Tyr Asp Tyr Ser Lys Asp
    1115   1120   1125

Phe Arg Arg Leu Gln Thr Met Arg Arg Ala Asp Ser Lys Ala Ser
    1130   1135   1140

Gly Thr Leu Ala Phe Leu Pro Leu Lys Asp Glu Leu Arg Asn Glu
    1145   1150   1155

Pro Leu Leu Leu His Pro Ala Pro Leu Asp Ile Ala Phe Gln Thr
    1160   1165   1170

Val Ile Gly Ala Tyr Ser Ser Pro Gly Asp Arg Arg Leu Arg Ser
    1175   1180   1185

Leu Tyr Val Pro Thr His Val Asp Arg Val Thr Leu Ile Pro Ser

Leu Cys Ile Ser Ala Gly Asn Ser Gly Glu Thr Glu Leu Ala Phe
    1205   1210   1215

Asp Thr Ile Asn Thr His Asp Lys Gly Asp Phe Leu Ser Gly Asp
    1220   1225   1230

Ile Thr Val Tyr Asp Ser Thr Lys Thr Thr Leu Phe Gln Val Asp
    1235   1240   1245

Asn Ile Val Phe Lys Pro Phe Ser Pro Pro Thr Ala Ser Thr Asp
    1250   1255   1260

His Arg Ile Phe Ala Lys Trp Val Trp Gly Pro Leu Thr Pro Glu
    1265   1270   1275

Lys Leu Leu Glu Asp Pro Ala Thr Leu Ile Ile Ala Arg Asp Lys
    1280   1285   1290

Glu Asp Ile Leu Thr Ile Glu Arg Ile Val Tyr Phe Tyr Ile Lys
    1295   1300   1305

Ser Phe Leu Ala Gln Ile Thr Pro Asp Asp Arg Gln Asn Ala Asp
    1310   1315   1320

Leu His Ser Gln Lys Tyr Ile Glu Trp Cys Asp Gln Val Gln Ala

```
        1325                    1330                    1335


Asp Ala  Arg Ala Gly His His  Gln Trp Tyr Gln Glu  Ser Trp Glu
    1340                1345                1350


Glu Asp  Thr Ser Val His Ile  Glu Gln Met Cys Glu  Ser Asn Ser
    1355                1360                1365


Ser His  Pro His Val Arg Leu  Ile Gln Arg Val Gly  Lys Glu Leu
    1370                1375                1380


Ile Ser  Ile Val Arg Gly Asn  Gly Asp Pro Leu Asp  Ile Met Asn
    1385                1390                1395


Arg Asp  Gly Leu Phe Thr Glu  Tyr Tyr Thr Asn Lys  Leu Ala Phe
    1400                1405                1410


Gly Ser  Ala Ile His Val Val  Gln Asp Leu Val Ser  Gln Ile Ala
    1415                1420                1425


His Arg  Tyr Gln Ser Ile Asp  Ile Leu Glu Ile Gly  Leu Gly Thr
    1430                1435                1440


Gly Ile  Ala Thr Lys Arg Val  Leu Ala Ser Pro Gln  Leu Gly Phe
    1445                1450                1455


Asn Ser  Tyr Thr Cys Thr Asp  Ile Ser Ala Asp Val  Ile Gly Lys
```

```
              1460                    1465                    1470


Ala Arg  Glu Gln Leu Ser Glu  Phe Asp Gly Leu Met  Gln Phe Glu
    1475                    1480                    1485


Ala Leu  Asp Ile Asn Arg Ser  Pro Ala Glu Gln Gly  Phe Lys Pro
    1490                    1495                    1500


His Ser  Tyr Asp Leu Ile Ile  Ala Ser Asp Val Leu  His Ala Ser
    1505                    1510                    1515


Ser Asn  Phe Glu Glu Lys Leu  Ala His Ile Arg Ser  Leu Leu Lys
     1520                    1525                    1530


Pro Gly  Gly His Leu Val Thr  Phe Gly Val Thr His  Arg Glu Pro
    1535                    1540                    1545


Ala Arg  Leu Ala Phe Ile Ser  Gly Leu Phe Ala Asp  Arg Trp Thr
    1550                    1555                    1560


Gly Glu  Asp Glu Thr Arg Ala  Leu Ser Ala Ser Gly  Ser Val Asp
    1565              .      1570                    1575


Gln Trp  Glu His Thr Leu Lys  Arg Val Gly Phe Ser  Gly Val Asp
    1580                    1585                   ·1590


Ser Arg  Thr Leu Asp Arg Glu  Asp Asp Leu Ile Pro  Ser Val Phe
```

1595   1600   1605

Ser Thr His Ala Val Asp Ala Thr Val Glu Arg Leu Tyr Asp Pro
-   1610   1615   1620

Leu Ser Ala Pro Leu Lys Asp Ser Tyr Pro Pro Leu Val Val Ile
    1625   1630   1635

Gly Gly Glu Ser Thr Lys Thr Glu Arg Ile Leu Asn Asp Met Lys
'   1640   1645   1650

Ala Ala Leu Pro His Arg His Ile His Ser Val Lys Arg Leu Glu
    1655   1660   1665

Ser Val Leu Asp Asp Pro Ala Leu Gln Pro Lys Ser Thr Phe Val
    1670   1675   1680

Ile Leu Ser Glu Leu Asp Asp Glu Val Phe Cys Asn Leu Glu Glu
    1685   1690   1695

Asp Lys Phe Glu Ala Val Lys Ser Leu Leu Phe Tyr Ala Gly Arg
    1700   1705   1710

Met Met Trp Leu Thr Glu Asn Ala Trp Ile Asp His Pro His Gln
    1715   1720   1725

Ala Ser Thr Ile Gly Met Leu Arg Thr Ile Lys Leu Glu Asn Pro

1730   1735   1740

Asp Leu Gly Thr His Val Phe Asp Val Asp Thr Val Glu Asn Leu
        1745   1750   1755

Asp Thr Lys Phe Phe Val Glu Gln Leu Leu Arg Phe Glu Glu Ser
        1760   1765   1770

Asp Asp Gln Leu Leu Glu Ser Ile Thr Trp Thr His Glu Pro Glu
        1775   1780   1785

Val Tyr Trp Cys Lys Gly Arg Ala Trp Val Pro Arg Leu Lys Gln
        1790   1795   1800

Asp Ile Ala Arg Asn Asp Arg Met Asn Ser Ser Arg Arg Pro Ile
        1805   1810   1815

Phe Gly Asn Phe Asn Ser Ser Lys Thr Ala Ile Ala Leu Lys Glu
        1820   1825   1830

Ala Arg Gly Ala Ser Ser Ser Met Tyr Tyr Leu Glu Ser Thr Glu
        1835   1840   1845

Thr Cys Asp Ser Leu Glu Asp Ala Arg His Ala Gly Lys Ala Thr
        1850   1855   1860

Val Arg Val Arg Tyr Ala Leu Pro Gln Ala Ile Arg Val Gly His

```
        1865                    1870                    1875


Leu Gly  Tyr Phe His Val Val  Gln Gly Ser Ile Leu  Glu Asn Thr
     1880                    1885                    1890


Cys Glu  Val Pro Val Val Ala  Leu Ala Glu Lys Asn  Gly Ser Ile
     1895                    1900                    1905


Leu His  Val Pro Arg Asn Tyr  Met His Ser Leu Pro  Asp Asn Met
     1910                    1915                    1920


Ala Glu  Gly Glu Asp Ser Ser  Phe Leu Leu Ser Thr  Ala Ala Ala
     1925                    1930                    1935


Leu Leu  Ala Glu Thr Ile Leu  Ser Ser Ala Gln Ser  Phe Gly Ser
     1940                    1945                    1950


Asp Ala  Ser Ile Leu Ile Met  Glu Pro Pro Ile Phe  Cys Val Lys
     1955                    1960                    1965


Ala Ile  Leu Glu Ser Ala Lys  Thr Tyr Gly Val Gln  Val His Leu
     1970                    1975                    1980


Ala Thr  Thr Leu Ser Asp Val  Lys Thr Ile Pro Ala  Pro Trp Ile
     1985                    1990                    1995


Arg Leu  His Ala Lys Glu Thr  Asp Ala Arg Leu Lys  His Ser Leu
```

```
                 2000                    2005                    2010


Pro Thr  Asn Met Met Ala Phe  Phe Asp Leu Ser Thr  Asp Arg Thr
     2015                2020                2025



Ala Ala  Gly Ile Thr Asn Arg  Leu Ala Lys Leu Leu  Pro Pro Ser
     2030                2035                2040



Cys Phe  Met Tyr Ser Gly Asp  Tyr Leu Ile Arg Ser  Thr Ala Ser
     2045                2050                2055



Thr Tyr  Lys Val Ser His Val  Glu Asp Ile Pro Ile  Leu Glu His
     2060                2065                2070



Ser Val  Ala Met Ala Lys Asn  Thr Val Ser Ala Ser  Thr Val Asp
     2075                2080                2085



Asp Thr  Glu Lys Val Ile Thr  Ala Thr Gln Ile Leu  Leu Pro Gly
     2090                2095                2100



Gln Leu  Ser Val Asn His Asn  Asp Gln Arg Phe Asn  Leu Ala Thr
     2105                2110                2115



Val Ile  Asp Trp Lys Glu Asn  Glu Val Ser Ala Arg  Ile Cys Pro
     2120                2125                2130



Ile Asp  Ser Gly Asn Leu Phe  Ser Asn Lys Lys Thr  Tyr Leu Leu
```

```
        2135                    2140                      2145


Val Gly  Leu Thr Gly Asp Leu  Gly Arg Ser Leu Cys  Arg Trp Met
    2150                    2155                      2160


Ile Leu  His Gly Ala Arg His  Val Val Leu Thr Ser  Arg Asn Pro
    2165                    2170                      2175


Arg Leu  Asp Pro Lys Trp Ile  Ala Asn Met Glu Ala  Leu Gly Gly
    2180                    2185                      2190


Asp Ile  Thr Val Leu Ser Met  Asp Val Ala Asn Glu  Asp Ser Val
    2195                    2200                      2205


Asp Ala  Gly Leu Gly Lys Leu  Val Asp Met Lys Leu  Pro Pro Val
    2210                    2215                      2220


Ala Gly  Ile Ala Phe Gly Pro  Leu Val Leu Gln Asp  Val Met Leu
    2225                    2230                      2235


Lys Asn  Met Asp His Gln Met  Met Asp Met Val Leu  Lys Pro Lys
    2240                    2245                      2250


Val Gln  Gly Ala Arg Ile Leu  His Glu Arg Phe Ser  Glu Gln Thr
    2255                    2260                      2265


Gly Ser  Lys Ala Leu Asp Phe  Phe Ile Met Phe Ser  Ser Ile Val
```

Ala Val Ile Gly Asn Pro Gly Gln Ser Asn Tyr Gly Ala Ala Asn
    2285   2290   2295

Ala Tyr Leu Gln Ala Leu Ala Gln Gln Arg Cys Ala Arg Gly Leu
    2300   2305   2310

Ala Gly Ser Thr Ile Asp Ile Gly Ala Val Tyr Gly Val Gly Phe
    2315   2320   2325

Val Thr Arg Ala Glu Met Glu Glu Asp Phe Asp Ala Ile Arg Phe
    2330   2335   2340

Met Phe Asp Ser Val Glu Glu His Glu Leu His Thr Leu Phe Ala
    2345   2350   2355

Glu Ala Val Val Ser Asp Gln Arg Ala Arg Gln Gln Pro Gln Arg
    2360   2365   2370

Lys Thr Val Ile Asp Met Ala Asp Leu Glu Leu Thr Thr Gly Ile
    2375   2380   2385

Pro Asp Leu Asp Pro Ala Leu Gln Asp Arg Ile Ile Tyr Phe Asn
    2390   2395   2400

Asp Pro Arg Phe Gly Asn Phe Lys Ile Pro Gly Gln Arg Gly Asp

Gly Gly Asp Asn Gly Ser Gly Ser Lys Gly Ser Ile Ala Asp Gln
    2420   2425   2430

Leu Lys Gln Ala Thr Thr Leu Asp Gln Val Arg Gln Ile Val Ile
    2435 .   2440   2445

Asp Gly Leu Ser Glu Lys Leu Arg Val Thr Leu Gln Val Ser Asp
    2450   2455   2460

Gly Glu Ser Val Asp Pro Thr Ile Pro Leu Ile Asp Gln Gly Val
    2465   2470   2475

Asp Ser Leu Gly Ala Val Thr Val Gly Ser Trp Phe Ser Lys Gln
    2480   2485   2490

Leu Tyr Leu Asp Leu Pro Leu Leu Arg Val Leu Gly Gly Ala Ser
    2495   2500   2505

Val Ala Asp Leu Ala Asp Asp Ala Ala Thr Arg Leu Pro Ala Thr
    2510   2515   2520

Ser Ile Pro Leu Leu Leu Gln Ile Gly Asp Ser Thr Gly Thr Ser
    2525   2530   2535

Asp Ser Gly Ala Ser Pro Thr Pro Thr Asp Ser His Asp Glu Ala

Ser Ser Ala Thr Ser Thr Asp Ala Ser Ser Ala Glu Glu Asp Glu
    2555   2560   2565

Glu Gln Glu Asp Asp Asn Glu Gln Gly Gly Arg Lys Ile Leu Arg
    2570   2575   2580

Arg Glu Arg Leu Ser Leu Gly Gln Glu Tyr Ser Trp Arg Gln Gln
    2585   2590   2595

Gln Met Val Lys Asp His Thr Ile Phe Asn Asn Thr Ile Gly Met
    2600   2605   2610

Phe Met Lys Gly Thr Ile Asp Leu Asp Arg Leu Arg Arg Ala Leu
    2615   2620   2625

Lys Ala Ser Leu Arg Arg His Glu Ile Phe Arg Thr Cys Phe Val
    2630   2635   2640

Thr Gly Asp Asp Tyr Ser Ser Asp Leu Asn Gly Pro Val Gln Val
    2645   2650   2655

Val Leu Lys Asn Pro Glu Asn Arg Val His Phe Val Gln Val Asn
    2660   2665   2670

Asn Ala Ala Glu Ala Glu Glu Glu Tyr Arg Lys Leu Glu Lys Thr

Asn Tyr Ser Ile Ser Thr Gly Asp Thr Leu Arg Leu Val Asp Phe
     2690   2695   2700

Tyr Trp Gly Thr Asp Asp His Leu Leu Val Ile Gly Tyr His Arg
     2705   2710   2715

Leu Val Gly Asp Gly Ser Thr Thr Glu Asn Leu Phe Asn Glu Ile
     2720   2725   2730

Gly Gln Ile Tyr Ser Gly Val Lys Met Gln Arg Pro Ser Thr Gln
     2735   2740   2745

Phe Ser Asp Leu Ala Val Gln Gln Arg Glu Asn Leu Glu Asn Gly
     2750   2755   2760

Arg Met Gly Asp Asp Ile Ala Phe Trp Lys Ser Met His Ser Lys
     2765   2770   2775

Val Ser Ser Ser Ala Pro Thr Val Leu Pro Ile Met Asn Leu Ile
     2780   2785   2790

Asn Asp Pro Ala Ala Asn Ser Glu Gln Gln Gln Ile Gln Pro Phe
     2795   2800   2805

Thr Trp Gln Gln Tyr Glu Ala Ile Ala Arg Leu Asp Pro Met Val

2810   2815   2820

Ala Phe Arg Ile Lys Glu Arg Ser Arg Lys His Lys Ala Thr Pro
     2825   2830   2835

Met Gln Phe Tyr Leu Ala Ala Tyr His Val Leu Leu Ala Arg Leu
     2840   2845   2850

Thr Gly Ser Lys Asp Ile Thr Ile Gly Leu Ala Glu Thr Asn Arg
     2855   2860   2865

Ser Thr Met Glu Glu Ile Ser Ala Met Gly Phe Phe Ala Asn Val
     2870   2875   2880

Leu Pro Leu Arg Phe Asp Glu Phe Val Gly Ser Lys Thr Phe Gly
     2885   2890   2895

Glu His Leu Val Ala Thr Lys Asp Ser Val Arg Glu Ala Met Gln
     2900   2905   2910

His Ala Arg Val Pro Tyr Gly Val Ile Leu Asp Cys Leu Gly Leu
     2915   2920   2925

Asn Leu Pro Thr Ser Gly Glu Glu Pro Lys Thr Gln Thr His Ala
     2930   2935   2940

Pro Leu Phe Gln Ala Val Phe Asp Tyr Lys Gln Gly Gln Ala Glu

Ser Gly Ser Ile Gly Asn Ala Lys Met Thr Ser Val Leu Ala Ser
    2960   2965   2970

Arg Glu Arg Thr Pro Tyr Asp Ile Val Leu Glu Met Trp Asp Asp
    2975   2980   2985

Pro Thr Lys Asp Pro Leu Ile His Val Lys Leu Gln Ser Ser Leu
    2990   2995   3000

Tyr Gly Pro Glu His Ala Gln Ala Phe Val Asp His Phe Ser Ser
    3005   3010   3015

Ile Leu Thr Met Phe Ser Met Asn Pro Ala Leu Lys Leu Ala
    3020   3025   3030

<210> 45
<211> 7692
<212> DNA
<213> Penicillium citrinum

<220>
<221> CDS
<222> (1)..(7692)

<400> 45
atg aac aat acc ccc gcc gta acc gca acc gca acc gca acc gca acc   48
Met Asn Asn Thr Pro Ala Val Thr Ala Thr Ala Thr Ala Thr Ala Thr
1   5   10   15

```
gca acc gca atg gca ggc tcg gct tgc tct aac aca tcc acg ccc att        96
Ala Thr Ala Met Ala Gly Ser Ala Cys Ser Asn Thr Ser Thr Pro Ile
            20                25                30

gcc ata gtt gga atg gga tgt cga ttt gct gga gat gca acg agt cca       144
Ala Ile Val Gly Met Gly Cys Arg Phe Ala Gly Asp Ala Thr Ser Pro
            35                40                45

cag aag ctt tgg gaa atg gtt gaa aga gga ggc agt gcc tgg tct aag       192
Gln Lys Leu Trp Glu Met Val Glu Arg Gly Gly Ser Ala Trp Ser Lys
        50                55                60

gtc ccc tcc tcg cga ttc aat gtg aga gga gta tac cac ccg aat ggc       240
Val Pro Ser Ser Arg Phe Asn Val Arg Gly Val Tyr His Pro Asn Gly
65                70                75                80

gaa agg gtc ggg tcc acc cac gta aag ggt gga cac ttc atc gac gag       288
Glu Arg Val Gly Ser Thr His Val Lys Gly Gly His Phe Ile Asp Glu
                85                90                95

gat cct gct tta ttt gac gcc gcg ttc ttc aac atg acc aca gag gtc       336
Asp Pro Ala Leu Phe Asp Ala Ala Phe Phe Asn Met Thr Thr Glu Val
            100               105               110

gcc agc tgc atg gat ccg cag tat cgg ctt atg ctt gag gtg gtc tac       384
Ala Ser Cys Met Asp Pro Gln Tyr Arg Leu Met Leu Glu Val Val Tyr
            115               120               125

gaa tcg ctg gag agt gcc ggt atc acc atc gat ggt atg gca ggc tct       432
Glu Ser Leu Glu Ser Ala Gly Ile Thr Ile Asp Gly Met Ala Gly Ser
        130               135               140

aat acg tcg gtg ttt ggg ggt gtc atg tac cac gac tat cag gat tcg       480
Asn Thr Ser Val Phe Gly Gly Val Met Tyr His Asp Tyr Gln Asp Ser
145               150               155               160
```

```
ctc aat cgt gac ccc gag aca gtt ccg cgt tat ttc ata act ggc aac    528
Leu Asn Arg Asp Pro Glu Thr Val Pro Arg Tyr Phe Ile Thr Gly Asn
                165                 170                 175

tca gga aca atg ctt tcg aac cgg ata tca cac ttc tac gac tta cgt    576
Ser Gly Thr Met Leu Ser Asn Arg Ile Ser His Phe Tyr Asp Leu Arg
                180                 185                 190

ggt ccc agc gtg acg gtt gac acg gcc tgt tcg acg aca ttg acc gca    624
Gly Pro Ser Val Thr Val Asp Thr Ala Cys Ser Thr Thr Leu Thr Ala
            195                 200                 205

ctg cac ttg gcg tgc cag agc tta cgt act ggg gag tca gat aca gcc    672
Leu His Leu Ala Cys Gln Ser Leu Arg Thr Gly Glu Ser Asp Thr Ala
        210                 215                 220

atc gtt atc ggt gca aat ctt ctg ctc aat ccc gat gtt ttt gtt acg    720
Ile Val Ile Gly Ala Asn Leu Leu Leu Asn Pro Asp Val Phe Val Thr
225                 230                 235                 240

atg tca aac ctg gga ttt ttg tcc ccg gat ggt atc tcg tac tct ttt    768
Met Ser Asn Leu Gly Phe Leu Ser Pro Asp Gly Ile Ser Tyr Ser Phe
                245                 250                 255

gat cct cga gcg aat gga tat ggt cgc ggg gaa gga att gcc gct ctg    816
Asp Pro Arg Ala Asn Gly Tyr Gly Arg Gly Glu Gly Ile Ala Ala Leu
                260                 265                 270

gta ata aag gcc ctc cct aac gcg ttg cga gac caa gac cct atc cga    864
Val Ile Lys Ala Leu Pro Asn Ala Leu Arg Asp Gln Asp Pro Ile Arg
            275                 280                 285

gcc gtc att cga gag aca gcg ctg aac cag gat ggc aaa aca ccc gca    912
Ala Val Ile Arg Glu Thr Ala Leu Asn Gln Asp Gly Lys Thr Pro Ala
        290                 295                 300
```

```
att act gcg ccg agt gat gtg gcg cag aaa agt ctg atc cag gag tgt     960
Ile Thr Ala Pro Ser Asp Val Ala Gln Lys Ser Leu Ile Gln Glu Cys
305                 310             315             320


tac gat aag gct ggg cta gat atg tcg ttg acc tcg tac gtg gag gcc    1008
Tyr Asp Lys Ala Gly Leu Asp Met Ser Leu Thr Ser Tyr Val Glu Ala
                325             330             335


cac gga act gga aca cca act ggt gac ccc ctt gaa atc tca gca att    1056
His Gly Thr Gly Thr Pro Thr Gly Asp Pro Leu Glu Ile Ser Ala Ile
                340             345             350


tca gca gct ttt aaa gga cat cct ctg cac ctt ggc tct gtg aaa gca    1104
Ser Ala Ala Phe Lys Gly His Pro Leu His Leu Gly Ser Val Lys Ala
            355             360             365


aat att ggc cat aca gaa gcc gcc agt ggc ctg gcc agt ata atc aag    1152
Asn Ile Gly His Thr Glu Ala Ala Ser Gly Leu Ala Ser Ile Ile Lys
        370             375             380


gtg gcc ttg gcc ttg gag aag ggc ttg att ccc cct aat gcg cgg ttc    1200
Val Ala Leu Ala Leu Glu Lys Gly Leu Ile Pro Pro Asn Ala Arg Phe
385                 390             395             400


ctg caa aag aac agc aag ctg atg ctt gac caa aag aac atc aag atc    1248
Leu Gln Lys Asn Ser Lys Leu Met Leu Asp Gln Lys Asn Ile Lys Ile
                405             410             415


ccc atg tct gct caa gac tgg cct gtg aaa gat ggg act cgt cgc gca    1296
Pro Met Ser Ala Gln Asp Trp Pro Val Lys Asp Gly Thr Arg Arg Ala
                420             425             430


tct gtc aat aac ttc ggc ttt ggt ggt tcg aat gct cac gtc att ttg    1344
Ser Val Asn Asn Phe Gly Phe Gly Gly Ser Asn Ala His Val Ile Leu
                435             440             445
```

```
gaa tca tat gat cgc gca tca ttg gcc ctg cca gag gat caa gtg cat      1392
Glu Ser Tyr Asp Arg Ala Ser Leu Ala Leu Pro Glu Asp Gln Val His
    450             455             460


gtc aat ggt aac tct gag cat ggt agg gtt gag gat ggt tcc aaa cag      1440
Val Asn Gly Asn Ser Glu His Gly Arg Val Glu Asp Gly Ser Lys Gln
465             470             475             480


agc cgc ata tac gtt gtg cgt gcc aag gac gag caa gct tgt cgg cga      1488
Ser Arg Ile Tyr Val Val Arg Ala Lys Asp Glu Gln Ala Cys Arg Arg
            485             490             495


acg ata gca agc ctg cga gac tac att aaa tcc gtc gct gac att gac      1536
Thr Ile Ala Ser Leu Arg Asp Tyr Ile Lys Ser Val Ala Asp Ile Asp
        500             505             510


ggg gaa ccc ttc ctc gcc agc ctc gcc tat aca cta ggc tct cgc cgt      1584
Gly Glu Pro Phe Leu Ala Ser Leu Ala Tyr Thr Leu Gly Ser Arg Arg
        515             520             525


tcc att ctg cca tgg acg tca gtg tat gta gca gac agc ctt ggc ggc      1632
Ser Ile Leu Pro Trp Thr Ser Val Tyr Val Ala Asp Ser Leu Gly Gly
    530             535             540


ctt gtt tct gcc ctc agc gat gag tcc aat caa cca aaa cga gcg aat      1680
Leu Val Ser Ala Leu Ser Asp Glu Ser Asn Gln Pro Lys Arg Ala Asn
545             550             555             560


gag aaa gta cgg ctc gga ttt gta ttc acc ggt cag ggg gcg cag tgg      1728
Glu Lys Val Arg Leu Gly Phe Val Phe Thr Gly Gln Gly Ala Gln Trp
            565             570             575


cat gca atg ggc aga gag ctg gtc aat aca ttc cca gta ttc aaa cag      1776
His Ala Met Gly Arg Glu Leu Val Asn Thr Phe Pro Val Phe Lys Gln
        580             585             590
```

```
gcg att ctt gaa tgt gat ggc tac atc aag caa ctg ggc gcg agt tgg      1824
Ala Ile Leu Glu Cys Asp Gly Tyr Ile Lys Gln Leu Gly Ala Ser Trp
        595                 600                 605


aat ttt atg gag gag ctc cac cgt gat gag ctg acg act cgg gta aat      1872
Asn Phe Met Glu Glu Leu His Arg Asp Glu Leu Thr Thr Arg Val Asn
        610                 615                 620


gat gcc gaa tac agt cta cca ctg tca acc gct atc caa att gca ctt      1920
Asp Ala Glu Tyr Ser Leu Pro Leu Ser Thr Ala Ile Gln Ile Ala Leu
625                 630                 635                 640


gtg cgt ctc ctt tgg tca tgg gga att cgg cca acg ggg ata acc agt      1968
Val Arg Leu Leu Trp Ser Trp Gly Ile Arg Pro Thr Gly Ile Thr Ser
                    645                 650                 655


cac tca agt gga gag gct gct gct gcc tac gca gct ggg gct tta tcc      2016
His Ser Ser Gly Glu Ala Ala Ala Ala Tyr Ala Ala Gly Ala Leu Ser
                660                 665                 670


gcg cgg tcg gcc att ggg atc act tat ata cgc ggt gta ttg acc act      2064
Ala Arg Ser Ala Ile Gly Ile Thr Tyr Ile Arg Gly Val Leu Thr Thr
                675                 680                 685


aag ccc aag ccc gca ttg gca gcc aaa gga gga atg atg gcg gtg ggt      2112
Lys Pro Lys Pro Ala Leu Ala Ala Lys Gly Gly Met Met Ala Val Gly
        690                 695                 700


ctt ggt cgc agt gag acc aat gtt tac att tcg cgt ctc aac cag gag      2160
Leu Gly Arg Ser Glu Thr Asn Val Tyr Ile Ser Arg Leu Asn Gln Glu
705                 710                 715                 720


gac ggc tgt gtg gtg gtt gga tgt atc aac agt caa tgt agt gtg acg      2208
Asp Gly Cys Val Val Val Gly Cys Ile Asn Ser Gln Cys Ser Val Thr
                    725                 730                 735
```

gtg tcg gga gat ttg ggt gca atc gag aaa ctt gaa aag ttg tta cac   2256
Val Ser Gly Asp Leu Gly Ala Ile Glu Lys Leu Glu Lys Leu Leu His
           740   745   750

gcc gat ggc atc ttt acc agg aaa ctg aaa gtc act gaa gcc ttc cat   2304
Ala Asp Gly Ile Phe Thr Arg Lys Leu Lys Val Thr Glu Ala Phe His
           755   760   765

tca agc cac atg cga cca atg gca gat gcc ttt ggg gcg tca ctg aga   2352
Ser Ser His Met Arg Pro Met Ala Asp Ala Phe Gly Ala Ser Leu Arg
           770   775   780

gat ctg ttc aac tcg gat aac aac aac gac aat ccc aat gct gac acc   2400
Asp Leu Phe Asn Ser Asp Asn Asn Asn Asp Asn Pro Asn Ala Asp Thr
785   790   795   800

tca aag ggt gta tta tat tca tca cct aag act ggt agt cgc atg acc   2448
Ser Lys Gly Val Leu Tyr Ser Ser Pro Lys Thr Gly Ser Arg Met Thr
               805   810   815

gat ctt aaa ttg cta ttg gat ccc aca cac tgg atg gat agt atg cta   2496
Asp Leu Lys Leu Leu Leu Asp Pro Thr His Trp Met Asp Ser Met Leu
           820   825   830

cag ccg gta gag ttc gag tcc tca ctc cgc gag atg tgc ttt gat ccc   2544
Gln Pro Val Glu Phe Glu Ser Ser Leu Arg Glu Met Cys Phe Asp Pro
           835   840   845

aac acc aaa gag aaa gcc gtc gat gtg att att gaa ata ggg cct cac   2592
Asn Thr Lys Glu Lys Ala Val Asp Val Ile Ile Glu Ile Gly Pro His
           850   855   860

gga gcg ctt ggt ggt cca atc aac caa gtc atg cag gat ctg ggt ctg   2640
Gly Ala Leu Gly Gly Pro Ile Asn Gln Val Met Gln Asp Leu Gly Leu
865   870   875   880

aaa gga aca gat ata aac tat ctc agt tgc ctt tct cgc ggc aga agc   2688
Lys Gly Thr Asp Ile Asn Tyr Leu Ser Cys Leu Ser Arg Gly Arg Ser
            885   890   895

tcg ttg gag aca atg tat cgt gct gct acg gag ttg ata agc aag ggt   2736
Ser Leu Glu Thr Met Tyr Arg Ala Ala Thr Glu Leu Ile Ser Lys Gly
            900   905   910

tat ggg ctc aaa atg gac gct ata aac ttt cct cat gga aga aaa gag   2784
Tyr Gly Leu Lys Met Asp Ala Ile Asn Phe Pro His Gly Arg Lys Glu
            915   920   925

ccc aga gtg aag gta ctg agc gat ttg ccg gcg tac ccg tgg aat cac   2832
Pro Arg Val Lys Val Leu Ser Asp Leu Pro Ala Tyr Pro Trp Asn His
            930   935   940

caa acc cgt tat tgg aga gag cct cgc ggc agt cgt gag tcc aaa cag   2880
Gln Thr Arg Tyr Trp Arg Glu Pro Arg Gly Ser Arg Glu Ser Lys Gln
945   950   955   960

aga acc cat ccg cct cac act ttg ata ggc tca cgg gaa tct ctc tct   2928
Arg Thr His Pro Pro His Thr Leu Ile Gly Ser Arg Glu Ser Leu Ser
            965   970   975

cct cat ttc gcg cct aaa tgg aaa cat gtt ctc cgt ctg tca gat att   2976
Pro His Phe Ala Pro Lys Trp Lys His Val Leu Arg Leu Ser Asp Ile
            980   985   990

cca tgg ata cga gat cac gtc gtt ggt tcg agc atc atc ttt ccg gga   3024
Pro Trp Ile Arg Asp His Val Val Gly Ser Ser Ile Ile Phe Pro Gly
            995   1000   1005

gct ggc ttc atc agc atg gcc atc gag ggg ttt tca caa gtc tgc   3069
Ala Gly Phe Ile Ser Met Ala Ile Glu Gly Phe Ser Gln Val Cys
            1010   1015   1020

```
cca cca  gtt gcg ggg gct agc  atc aac tac aac ttg  cgt gac gtt        3114
Pro Pro  Val Ala Gly Ala Ser  Ile Asn Tyr Asn Leu  Arg Asp Val
    1025             1030              1035


gaa ctc  gcg cag gct ctc ata  ata ccc gct gat gca  gaa gca gag        3159
Glu Leu  Ala Gln Ala Leu Ile  Ile Pro Ala Asp Ala  Glu Ala Glu
    1040             1045              1050


gtt gac  ctg cgc cta acg atc  cgt tca tgt gag gaa  agg tcc ctc        3204
Val Asp  Leu Arg Leu Thr Ile  Arg Ser Cys Glu Glu  Arg Ser Leu
    1055             1060              1065


ggc aca  aag aac tgg cat caa  ttt tct gtg cac tca  att tcg ggc        3249
Gly Thr  Lys Asn Trp His Gln  Phe Ser Val His Ser  Ile Ser Gly
    1070             1075              1080


gaa aat  aat acc tgg aca gaa  cac tgc acc gga tta  ata cgt tcg        3294
Glu Asn  Asn Thr Trp Thr Glu  His Cys Thr Gly Leu  Ile Arg Ser
    1085             1090              1095


gag agc  gaa aga agc cac ctt  gac tgt tca act gtg  gaa gcc tca        3339
Glu Ser  Glu Arg Ser His Leu  Asp Cys Ser Thr Val  Glu Ala Ser
    1100             1105              1110


cgc agg  ttg aat cta ggc tca  gat aac cgg agc att  gat ccc aac        3384
Arg Arg  Leu Asn Leu Gly Ser  Asp Asn Arg Ser Ile  Asp Pro Asn
    1115             1120              1125


gat ctc  tgg gag tcc tta cac  gcg aat ggg ata tgc  cac gga ccc        3429
Asp Leu  Trp Glu Ser Leu His  Ala Asn Gly Ile Cys  His Gly Pro
    1130             1135              1140


att ttt  cag aac att cag cga  att caa aac aat gga  cag ggc tcg        3474
Ile Phe  Gln Asn Ile Gln Arg  Ile Gln Asn Asn Gly  Gln Gly Ser
    1145             1150              1155
```

```
ttt tgc  aga ttt tcc att gct  gac act gcc tcg gct  atg cct cac      3519
Phe Cys  Arg Phe Ser Ile Ala  Asp Thr Ala Ser Ala  Met Pro His
    1160                 1165               1170


tcg tac  gag aat cga cac atc  gtc cat cct act act  ctg gac tcg      3564
Ser Tyr  Glu Asn Arg His Ile  Val His Pro Thr Thr  Leu Asp Ser
    1175                 1180               1185


gtg atc  cag gcg gca tac acg  gtg tta ccc tac gcg  gga aca cgt      3609
Val Ile  Gln Ala Ala Tyr Thr  Val Leu Pro Tyr Ala  Gly Thr Arg
    1190                 1195               1200


atg aaa  acg gcc atg gta cca  agg agg cta aga aat  gtc aaa ata      3654
Met Lys  Thr Ala Met Val Pro  Arg Arg Leu Arg Asn  Val Lys Ile
    1205                 1210               1215


tcc tct  agc ctg gct gac ttg  gag gct ggt gat gct  ctg gac gca      3699
Ser Ser  Ser Leu Ala Asp Leu  Glu Ala Gly Asp Ala  Leu Asp Ala
    1220                 1225               1230


cag gcc  agc atc aag gat cgc  aac tct caa tcc ttc  tct acc gac      3744
Gln Ala  Ser Ile Lys Asp Arg  Asn Ser Gln Ser Phe  Ser Thr Asp
    1235                 1240               1245


ttg gca  gtg ttt gat gac tat  gat agc ggt tct tct  ccc tcg gac      3789
Leu Ala  Val Phe Asp Asp Tyr  Asp Ser Gly Ser Ser  Pro Ser Asp
     1250                1255               1260


gga atc  cca gtc ata gag att  gaa ggc ctt gtt ttc  cag tcg gtt      3834
Gly Ile  Pro Val Ile Glu Ile  Glu Gly Leu Val Phe  Gln Ser Val
    1265                 1270               1275


gga agc  agc ttc tct gac caa  aag tca gac tcc aac  gac aca gaa      3879
Gly Ser  Ser Phe Ser Asp Gln  Lys Ser Asp Ser Asn  Asp Thr Glu
    1280                 1285               1290
```

```
aat gcc  tgc agc tcc tgg gtt  tgg gcc cct gac atc  agc ttg ggt       3924
Asn Ala Cys Ser Ser Trp Val  Trp Ala Pro Asp Ile  Ser Leu Gly
    1295              1300             1305


gac tcc  act tgg ctc aaa gaa  aag ttg agc act gag  gct gag acg       3969
Asp Ser Thr Trp Leu Lys Glu  Lys Leu Ser Thr Glu  Ala Glu Thr
    1310              1315             1320


aaa gaa  acg gaa ctc atg atg  gac ctc cga aga tgc  acg atc aac       4014
Lys Glu Thr Glu Leu Met Met  Asp Leu Arg Arg Cys  Thr Ile Asn
    1325              1330             1335


ttt ata  cag gag gct gtc act  gat ttg aca aat tct  gat atc caa       4059
Phe Ile Gln Glu Ala Val Thr  Asp Leu Thr Asn Ser  Asp Ile Gln
    1340              1345             1350


cat ctg  gat ggc cac ctt cag  aag tat ttc gat tgg  atg aat gtc       4104
His Leu Asp Gly His Leu Gln  Lys Tyr Phe Asp Trp  Met Asn Val
    1355              1360             1365


caa ttg  gac ctt gcg aga caa  aac aag ctc agc cca  gcc agt tgc       4149
Gln Leu Asp Leu Ala Arg Gln  Asn Lys Leu Ser Pro  Ala Ser Cys
    1370              1375             1380


gac tgg  cta agt gac gat gct  gag cag aag aaa tgc  cta cag gcc       4194
Asp Trp Leu Ser Asp Asp Ala  Glu Gln Lys Lys Cys  Leu Gln Ala
    1385              1390             1395


aga gtc  gct gga gaa agc gtc  aat ggc gag atg att  tct cgt cta       4239
Arg Val Ala Gly Glu Ser Val  Asn Gly Glu Met Ile  Ser Arg Leu
    1400              1405             1410


gga cct  cag tta ata gca atg  cta cgc cgc gaa aca  gag cca ctt       4284
Gly Pro Gln Leu Ile Ala Met  Leu Arg Arg Glu Thr  Glu Pro Leu
    1415              1420             1425
```

```
gag ttg atg atg caa gat cag  ctg cta agc aga tac  tac gtc aac          4329
Glu Leu Met Met Gln Asp Gln  Leu Leu Ser Arg Tyr  Tyr Val Asn
        1430            1435            1440


gca atc aaa tgg agc cga tca  aac gca caa gcc agc  gag ctg atc          4374
Ala Ile Lys Trp Ser Arg Ser  Asn Ala Gln Ala Ser  Glu Leu Ile
        1445            1450            1455


cga ctt tgc gcc cac aag aac  ccg cgt tct cgc att  ttg gag att          4419
Arg Leu Cys Ala His Lys Asn  Pro Arg Ser Arg Ile  Leu Glu Ile
        1460            1465            1470


ggc gga ggc acg ggc ggc tgc  aca aag ctt att gtc  aat gca ttg          4464
Gly Gly Gly Thr Gly Gly Cys  Thr Lys Leu Ile Val  Asn Ala Leu
        1475            1480            1485


gga aac acc aag ccg atc gat  cgt tat gac ttc acc  gat gtg tct          4509
Gly Asn Thr Lys Pro Ile Asp  Arg Tyr Asp Phe Thr  Asp Val Ser
        1490            1495            1500


gcc ggg ttt ttc gag tcg gcg  cgt gag caa ttt gcg  gat tgg caa          4554
Ala Gly Phe Phe Glu Ser Ala  Arg Glu Gln Phe Ala  Asp Trp Gln
        1505            1510            1515


gac gtg atg act ttc aaa aaa  ttg gat att gaa agc  gat ccc gag          4599
Asp Val Met Thr Phe Lys Lys  Leu Asp Ile Glu Ser  Asp Pro Glu
        1520            1525            1530


caa caa ggg ttt gaa tgt gcc  acc tac gat gtg gtc  gtg gct tgc          4644
Gln Gln Gly Phe Glu Cys Ala  Thr Tyr Asp Val Val  Val Ala Cys
        1535            1540            1545


cag gtc ctg cat gca act cga  tgc atg aaa cga aca  ctg agt aac          4689
Gln Val Leu His Ala Thr Arg  Cys Met Lys Arg Thr  Leu Ser Asn
        1550            1555            1560
```

```
gtt cga  aaa ttg ctc aag cct  ggg ggc aac ttg att  ttg gtt gag        4734
Val Arg  Lys Leu Leu Lys Pro  Gly Gly Asn Leu Ile  Leu Val Glu
    1565              1570              1575


act acc  agg gat cag ctc gat  ttg ttc ttt acc ttc  gga ctg ttg        4779
Thr Thr  Arg Asp Gln Leu Asp  Leu Phe Phe Thr Phe  Gly Leu Leu
    1580              1585              1590


cca ggt  tgg tgg ctc agt gag  gag cct gag cgg aag  tcg acg cca        4824
Pro Gly  Trp Trp Leu Ser Glu  Glu Pro Glu Arg Lys  Ser Thr Pro
    1595              1600              1605


tcg ctc  act acc gat ctt tgg  aac acc atg ttg gac  acg agc ggt        4869
Ser Leu  Thr Thr Asp Leu Trp  Asn Thr Met Leu Asp  Thr Ser Gly
    1610              1615              1620


ttc aac  ggt gtg gaa ttg gag  gtt cgt gat tgt gaa  gac gat gag        4914
Phe Asn  Gly Val Glu Leu Glu  Val Arg Asp Cys Glu  Asp Asp Glu
    1625              1630              1635


ttt tac  atg atc agc aca atg  cta tcg acg gct aga  aaa gag aat        4959
Phe Tyr  Met Ile Ser Thr Met  Leu Ser Thr Ala Arg  Lys Glu Asn
    1640              1645              1650


aca acc  ccg gat aca gtg gca  gaa tcg gag gtg ctt  ttg ctg cac        5004
Thr Thr  Pro Asp Thr Val Ala  Glu Ser Glu Val Leu  Leu Leu His
    1655              1660              1665


gga gcg  ctc cga cct cct tca  tct tgg ctg gaa agt  ctc cag gca        5049
Gly Ala  Leu Arg Pro Pro Ser  Ser Trp Leu Glu Ser  Leu Gln Ala
    1670              1675              1680


gca att  tgt gaa aag acc agt  tct agc cca tcg atc  aac gct ctg        5094
Ala Ile  Cys Glu Lys Thr Ser  Ser Ser Pro Ser Ile  Asn Ala Leu
    1685              1690              1695
```

```
ggc gag gta gat acc act gga  agg aca tgc att ttt  ctt ggg gaa        5139
Gly Glu Val Asp Thr Thr Gly  Arg Thr Cys Ile Phe  Leu Gly Glu
    1700            1705            1710


atg gag tcc tcg ctc ctt gga  gag gtg gga agc gag  acc ttc aaa        5184
Met Glu Ser Ser Leu Leu Gly  Glu Val Gly Ser Glu  Thr Phe Lys
    1715            1720            1725


tcc atc acc gcg atg ctg aat  aac tgc aac gca ctt  ctc tgg gtg        5229
Ser Ile Thr Ala Met Leu Asn  Asn Cys Asn Ala Leu  Leu Trp Val
    1730            1735            1740


tct aga gga gca gcc atg agc  tcc gag gat cca tgg  aaa gct cta        5274
Ser Arg Gly Ala Ala Met Ser  Ser Glu Asp Pro Trp  Lys Ala Leu
    1745            1750            1755


cat att ggt ctg ctg cgt acc  atc cgc aac gaa aat  aac ggg aag        5319
His Ile Gly Leu Leu Arg Thr  Ile Arg Asn Glu Asn  Asn Gly Lys
    1760            1765            1770


gaa tat gta tcg ttg gat ctc  gat cct tct cga aac  gca tac acc        5364
Glu Tyr Val Ser Leu Asp Leu  Asp Pro Ser Arg Asn  Ala Tyr Thr
    1775            1780            1785


cac gag tcc ctg tat gct atc  tgc aat atc ttc aat  ggc cgc ctc        5409
His Glu Ser Leu Tyr Ala Ile  Cys Asn Ile Phe Asn  Gly Arg Leu
    1790            1795            1800


ggc gac ctt tcc gaa gac aag  gag ttt gaa ttt gca  gag aga aac        5454
Gly Asp Leu Ser Glu Asp Lys  Glu Phe Glu Phe Ala  Glu Arg Asn
    1805            1810            1815


ggc gtc atc cac gta ccg cga  ctt ttc aat gac ccg  cac tgg aag        5499
Gly Val Ile His Val Pro Arg  Leu Phe Asn Asp Pro  His Trp Lys
    1820            1825            1830
```

```
gac caa  gaa gcg gtt gag gtc  aca ctg cag ccg ttc  gag caa ccc      5544
Asp Gln  Glu Ala Val Glu Val  Thr Leu Gln Pro Phe  Glu Gln Pro
    1835                1840             1845


ggg cgt  cgt ctg cgg atg gag  gtt gag acg cca ggg  ctc tta gac      5589
Gly Arg  Arg Leu Arg Met Glu  Val Glu Thr Pro Gly  Leu Leu Asp
    1850                1855             1860


tcc ctg  caa ttt cga gac gac  gaa gga cgt gaa ggc  aag gat ctt      5634
Ser Leu  Gln Phe Arg Asp Asp  Glu Gly Arg Glu Gly  Lys Asp Leu
    1865                1870             1875


ccg gat  gat tgg gta gaa atc  gaa ccc aaa gct ttc  ggt ctc aat      5679
Pro Asp  Asp Trp Val Glu Ile  Glu Pro Lys Ala Phe  Gly Leu Asn
    1880                1885             1890


ttt cgg  gat gtc atg gtt gcc  atg ggt caa ttg gag  gcc aac cgt      5724
Phe Arg  Asp Val Met Val Ala  Met Gly Gln Leu Glu  Ala Asn Arg
    1895                1900             1905


gtg atg  ggc ttc gaa tgc gcc  gga gtg atc aca aag  ctc ggt gga      5769
Val Met  Gly Phe Glu Cys Ala  Gly Val Ile Thr Lys  Leu Gly Gly
    1910                1915             1920


gct gct  gcc gct agc caa ggc  ctc aga tta ggg gac  cgc gta tgt      5814
Ala Ala  Ala Ala Ser Gln Gly  Leu Arg Leu Gly Asp  Arg Val Cys
    1925                1930             1935


gca cta  ctg aaa ggc cat tgg  gcg acc aga aca cag  acg ccg tac      5859
Ala Leu  Leu Lys Gly His Trp  Ala Thr Arg Thr Gln  Thr Pro Tyr
    1940                1945             1950


act aat  gtc gtc cgt att ccg  gac gaa atg ggc ttc  cca gaa gcc      5904
Thr Asn  Val Val Arg Ile Pro  Asp Glu Met Gly Phe  Pro Glu Ala
    1955                1960             1965
```

```
gct tcg gtc ccc ctg gct ttc  act acc gca tat att  gcg ctt tat      5949
Ala Ser Val Pro Leu Ala Phe  Thr Thr Ala Tyr Ile  Ala Leu Tyr
    1970            1975              1980


acc acg gca aag cta cga cga  ggc gaa aga gtc ttg  atc cac agt      5994
Thr Thr Ala Lys Leu Arg Arg  Gly Glu Arg Val Leu  Ile His Ser
    1985            1990              1995


gga gct gga ggc gtc ggt caa  gca gcg atc att ttg  tcc cag ctt      6039
Gly Ala Gly Gly Val Gly Gln  Ala Ala Ile Ile Leu  Ser Gln Leu
    2000            2005              2010


gcg ggt gcc gag gtc ttc gtc  aca gcg gga act caa  gcc aag cgt      6084
Ala Gly Ala Glu Val Phe Val  Thr Ala Gly Thr Gln  Ala Lys Arg
    2015            2020              2025


gac ttt gtc ggc gat aaa ttc  ggc atc aat ccg gat  cat atc ttc      6129
Asp Phe Val Gly Asp Lys Phe  Gly Ile Asn Pro Asp  His Ile Phe
    2030            2035              2040


tcg agc agg aat gac tta ttc  gtc gac ggc atc aaa  gcc tac acg      6174
Ser Ser Arg Asn Asp Leu Phe  Val Asp Gly Ile Lys  Ala Tyr Thr
    2045            2050              2055


ggc gga ctt ggc gtt cat gtc  gtt cta aac tca ttg  gca ggt caa      6219
Gly Gly Leu Gly Val His Val  Val Leu Asn Ser Leu  Ala Gly Gln
    2060            2065              2070


ctc ctc caa gca agc ttt gac  tgc atg gcc gaa ttc  ggc aga ttt      6264
Leu Leu Gln Ala Ser Phe Asp  Cys Met Ala Glu Phe  Gly Arg Phe
    2075            2080              2085


gtt gag att gga aaa aag gac  ctg gag caa aac agc  aga ctt gac      6309
Val Glu Ile Gly Lys Lys Asp  Leu Glu Gln Asn Ser  Arg Leu Asp
    2090            2095              2100
```

```
atg ctg  cca ttc acc cgg gac  gtc tct ttc aca tca  att gat ctt      6354
Met Leu  Pro Phe Thr Arg Asp  Val Ser Phe Thr Ser  Ile Asp Leu
    2105             2110             2115


ctc tcg  tgg caa aga gcc aaa  agt gaa gaa gta tcc  gaa gcg ttg      6399
Leu Ser  Trp Gln Arg Ala Lys  Ser Glu Glu Val Ser  Glu Ala Leu
    2120             2125             2130


aac cat  gtc aca aaa ctc ctc  gag aca aaa gcg att  ggc ttg att      6444
Asn His  Val Thr Lys Leu Leu  Glu Thr Lys Ala Ile  Gly Leu Ile
    2135             2140             2145


ggt cca  atc cag cag cac tcc  ttg tca aac atc gag  aag gcc ttc      6489
Gly Pro  Ile Gln Gln His Ser  Leu Ser Asn Ile Glu  Lys Ala Phe
    2150             2155             2160


cgt acg  atg cag agt ggt cag  cat gtt ggc aaa gtt  gtg gtc aat      6534
Arg Thr  Met Gln Ser Gly Gln  His Val Gly Lys Val  Val Val Asn
    2165             2170             2175


gta tct  ggg gac gaa ctg gtc  cca gtc ggc gat gga  ggg ttc tcg      6579
Val Ser  Gly Asp Glu Leu Val  Pro Val Gly Asp Gly  Gly Phe Ser
    2180             2185             2190


ctg aag  ctg aag cct gac agt  tct tac cta gtt gct  ggt ggg ctg      6624
Leu Lys  Leu Lys Pro Asp Ser  Ser Tyr Leu Val Ala  Gly Gly Leu
    2195             2200             2205


ggg gga  att gga aag cag atc  tgt cag tgg ctt gtt  gat cat ggc      6669
Gly Gly  Ile Gly Lys Gln Ile  Cys Gln Trp Leu Val  Asp His Gly
    2210             2215             2220


gcg aag  cac ttg att atc cta  tcg aga agt gca aag  gcc agt cca      6714
Ala Lys  His Leu Ile Ile Leu  Ser Arg Ser Ala Lys  Ala Ser Pro
    2225             2230             2235
```

```
ttc ata  acc agc ttg caa aat  caa cag tgc gct gtc  tat cta cac       6759
Phe Ile  Thr Ser Leu Gln Asn  Gln Gln Cys Ala Val  Tyr Leu His
    2240                 2245              2250


gca tgt  gac atc tca gat caa  gat cag gtc acc aag  gtg ctc cgg       6804
Ala Cys  Asp Ile Ser Asp Gln  Asp Gln Val Thr Lys  Val Leu Arg
    2255                 2260              2265


ttg tgc  gaa gaa gca cat gca  ccg cca att cga ggt  atc ata caa       6849
Leu Cys  Glu Glu Ala His Ala  Pro Pro Ile Arg Gly  Ile Ile Gln
    2270                 2275              2280


ggt gcc  atg gtt ctc aag gac  gcg ctt cta tcg cga  atg aca ttg       6894
Gly Ala  Met Val Leu Lys Asp  Ala Leu Leu Ser Arg  Met Thr Leu
    2285                 2290              2295


gat gaa  ttt aat gca gca aca  cgc cca aaa gta cag  ggt agt tgg       6939
Asp Glu  Phe Asn Ala Ala Thr  Arg Pro Lys Val Gln  Gly Ser Trp
    2300                 2305              2310


tat ctt  cac aag atc gca cag  gat gtt gac ttc ttc  gtg atg ctc       6984
Tyr Leu  His Lys Ile Ala Gln  Asp Val Asp Phe Phe  Val Met Leu
    2315                 2320              2325


tca tcc  ctt gtt ggg gtc atg  ggt ggg gca ggc cag  gcc aat tac       7029
Ser Ser  Leu Val Gly Val Met  Gly Gly Ala Gly Gln  Ala Asn Tyr
    2330                 2335              2340


gca gct  gct ggt gca ttc cag  gac gca ctt gcg cac  cac cgg aga       7074
Ala Ala  Ala Gly Ala Phe Gln  Asp Ala Leu Ala His  His Arg Arg
    2345                 2350              2355


gcc cat  ggc atg ccg gct gtc  acc att gac ttg ggc  atg gtc aag       7119
Ala His  Gly Met Pro Ala Val  Thr Ile Asp Leu Gly  Met Val Lys
    2360                 2365              2370
```

tct gtt gga tac gtg gct gaa act ggc cgt ggt gtg gcc gac cgg   7164
Ser Val Gly Tyr Val Ala Glu Thr Gly Arg Gly Val Ala Asp Arg
    2375   2380   2385

ctc gct aga ata ggt tac aag cct atg cat gaa aag gac gtc atg   7209
Leu Ala Arg Ile Gly Tyr Lys Pro Met His Glu Lys Asp Val Met
    2390   2395   2400

gat gtg ttg gag aag gca atc ctg tgt tct tcc cct caa ttt cca   7254
Asp Val Leu Glu Lys Ala Ile Leu Cys Ser Ser Pro Gln Phe Pro
    2405   2410   2415

tca cct ccc gca gct gtg gtt aca gga atc aac aca tcc ccg ggt   7299
Ser Pro Pro Ala Ala Val Val Thr Gly Ile Asn Thr Ser Pro Gly
    2420   2425   2430

gct cac tgg acc gag gca aac tgg ata cag gaa cag cgg ttt gtg   7344
Ala His Trp Thr Glu Ala Asn Trp Ile Gln Glu Gln Arg Phe Val
    2435   2440   2445

gga ctt aaa tac cgc caa gtc ctt cat gca gac caa tcc ttt gtc   7389
Gly Leu Lys Tyr Arg Gln Val Leu His Ala Asp Gln Ser Phe Val
    2450   2455   2460

tct tcg cat aaa aaa gga cca gat ggc gtg cgg gcc caa cta agc   7434
Ser Ser His Lys Lys Gly Pro Asp Gly Val Arg Ala Gln Leu Ser
    2465   2470   2475

agg gtc acc tct cac gac gag gcc att tct atc gtc ctc aaa gca   7479
Arg Val Thr Ser His Asp Glu Ala Ile Ser Ile Val Leu Lys Ala
    2480   2485   2490

atg acg gaa aag ctg atg cga atg ttt ggt ctg gca gaa gac gac   7524
Met Thr Glu Lys Leu Met Arg Met Phe Gly Leu Ala Glu Asp Asp
    2495   2500   2505

```
atg tcc  tcg tcc aaa aac ctg  gca ggt gtc ggc gta  gac tca ctc      7569
Met Ser  Ser Ser Lys Asn Leu  Ala Gly Val Gly Val  Asp Ser Leu
    2510              2515              2520


gtc gcc  att gaa ctt cga aac  tgg atc aca tct gaa  atc cat gtt      7614
Val Ala  Ile Glu Leu Arg Asn  Trp Ile Thr Ser Glu  Ile His Val
    2525              2530              2535


gat gtg  tcg atc ttt gag ctc  atg aat ggt aac acc  atc gcc ggc      7659
Asp Val  Ser Ile Phe Glu Leu  Met Asn Gly Asn Thr  Ile Ala Gly
    2540              2545              2550


ctc gtc  gag tta gtt gtg gcg  aaa tgc agt taa                       7692
Leu Val  Glu Leu Val Val Ala  Lys Cys Ser
    2555              2560
```

<210> 46
<211> 2563
<212> PRT
<213> Penicillium citrinum

<400> 46

```
Met Asn Asn Thr Pro Ala Val Thr Ala Thr Ala Thr Ala Thr Ala Thr
1               5                   10                  15


Ala Thr Ala Met Ala Gly Ser Ala Cys Ser Asn Thr Ser Thr Pro Ile
            20                  25                  30


Ala Ile Val Gly Met Gly Cys Arg Phe Ala Gly Asp Ala Thr Ser Pro
        35                  40                  45
```

```
Gln Lys Leu Trp Glu Met Val Glu Arg Gly Gly Ser Ala Trp Ser Lys
    50                  55                  60


Val Pro Ser Ser Arg Phe Asn Val Arg Gly Val Tyr His Pro Asn Gly
65                  70                  75                  80


Glu Arg Val Gly Ser Thr His Val Lys Gly Gly His Phe Ile Asp Glu
                85                  90                  95


Asp Pro Ala Leu Phe Asp Ala Ala Phe Phe Asn Met Thr Thr Glu Val
                100                 105                 110


Ala Ser Cys Met Asp Pro Gln Tyr Arg Leu Met Leu Glu Val Val Tyr
            115                 120                 125


Glu Ser Leu Glu Ser Ala Gly Ile Thr Ile Asp Gly Met Ala Gly Ser
    130                 135                 140


Asn Thr Ser Val Phe Gly Gly Val Met Tyr His Asp Tyr Gln Asp Ser
145                 150                 155                 160


Leu Asn Arg Asp Pro Glu Thr Val Pro Arg Tyr Phe Ile Thr Gly Asn
                165                 170                 175


Ser Gly Thr Met Leu Ser Asn Arg Ile Ser His Phe Tyr Asp Leu Arg
                180                 185                 190
```

Gly Pro Ser Val Thr Val Asp Thr Ala Cys Ser Thr Thr Leu Thr Ala
     195   200   205

Leu His Leu Ala Cys Gln Ser Leu Arg Thr Gly Glu Ser Asp Thr Ala
     210   215   220

Ile Val Ile Gly Ala Asn Leu Leu Leu Asn Pro Asp Val Phe Val Thr
225   230   235   240

Met Ser Asn Leu Gly Phe Leu Ser Pro Asp Gly Ile Ser Tyr Ser Phe
         245   250   255

Asp Pro Arg Ala Asn Gly Tyr Gly Arg Gly Glu Gly Ile Ala Ala Leu
       260   265   270

Val Ile Lys Ala Leu Pro Asn Ala Leu Arg Asp Gln Asp Pro Ile Arg
      275   280   285

Ala Val Ile Arg Glu Thr Ala Leu Asn Gln Asp Gly Lys Thr Pro Ala
     290   295   300

Ile Thr Ala Pro Ser Asp Val Ala Gln Lys Ser Leu Ile Gln Glu Cys
305   310   315   320

Tyr Asp Lys Ala Gly Leu Asp Met Ser Leu Thr Ser Tyr Val Glu Ala
       325   330   335

His Gly Thr Gly Thr Pro Thr Gly Asp Pro Leu Glu Ile Ser Ala Ile
        340   345   350

Ser Ala Ala Phe Lys Gly His Pro Leu His Leu Gly Ser Val Lys Ala
        355   360   365

Asn Ile Gly His Thr Glu Ala Ala Ser Gly Leu Ala Ser Ile Ile Lys
        370   375   380

Val Ala Leu Ala Leu Glu Lys Gly Leu Ile Pro Pro Asn Ala Arg Phe
385   390   395   400

Leu Gln Lys Asn Ser Lys Leu Met Leu Asp Gln Lys Asn Ile Lys Ile
                405   410   415

Pro Met Ser Ala Gln Asp Trp Pro Val Lys Asp Gly Thr Arg Arg Ala
                420   425   430

Ser Val Asn Asn Phe Gly Phe Gly Gly Ser Asn Ala His Val Ile Leu
                435   440   445

Glu Ser Tyr Asp Arg Ala Ser Leu Ala Leu Pro Glu Asp Gln Val His
        450   455   460

Val Asn Gly Asn Ser Glu His Gly Arg Val Glu Asp Gly Ser Lys Gln
465   470   475   480

Ser Arg Ile Tyr Val Val Arg Ala Lys Asp Glu Gln Ala Cys Arg Arg
            485   490   495

Thr Ile Ala Ser Leu Arg Asp Tyr Ile Lys Ser Val Ala Asp Ile Asp
            500   505   510

Gly Glu Pro Phe Leu Ala Ser Leu Ala Tyr Thr Leu Gly Ser Arg Arg
            515   520   525

Ser Ile Leu Pro Trp Thr Ser Val Tyr Val Ala Asp Ser Leu Gly Gly
        530   535   540

Leu Val Ser Ala Leu Ser Asp Glu Ser Asn Gln Pro Lys Arg Ala Asn
545   550   555   560

Glu Lys Val Arg Leu Gly Phe Val Phe Thr Gly Gln Gly Ala Gln Trp
            565   570   575

His Ala Met Gly Arg Glu Leu Val Asn Thr Phe Pro Val Phe Lys Gln
            580   585   590

Ala Ile Leu Glu Cys Asp Gly Tyr Ile Lys Gln Leu Gly Ala Ser Trp
            595   600   605

Asn Phe Met Glu Glu Leu His Arg Asp Glu Leu Thr Thr Arg Val Asn
        610   615   620

Asp Ala Glu Tyr Ser Leu Pro Leu Ser Thr Ala Ile Gln Ile Ala Leu
625   630   635   640

Val Arg Leu Leu Trp Ser Trp Gly Ile Arg Pro Thr Gly Ile Thr Ser
              645   650   655

His Ser Ser Gly Glu Ala Ala Ala Ala Tyr Ala Ala Gly Ala Leu Ser
              660   665   670

Ala Arg Ser Ala Ile Gly Ile Thr Tyr Ile Arg Gly Val Leu Thr Thr
              675   680   685

Lys Pro Lys Pro Ala Leu Ala Ala Lys Gly Gly Met Met Ala Val Gly
          690   695   700

Leu Gly Arg Ser Glu Thr Asn Val Tyr Ile Ser Arg Leu Asn Gln Glu
705   710   715   720

Asp Gly Cys Val Val Val Gly Cys Ile Asn Ser Gln Cys Ser Val Thr
              725   730   735

Val Ser Gly Asp Leu Gly Ala Ile Glu Lys Leu Glu Lys Leu Leu His
              740   745   750

Ala Asp Gly Ile Phe Thr Arg Lys Leu Lys Val Thr Glu Ala Phe His
              755   760   765

Ser Ser His Met Arg Pro Met Ala Asp Ala Phe Gly Ala Ser Leu Arg
   770   775   780

Asp Leu Phe Asn Ser Asp Asn Asn Asn Asp Asn Pro Asn Ala Asp Thr
785   790   795   800

Ser Lys Gly Val Leu Tyr Ser Ser Pro Lys Thr Gly Ser Arg Met Thr
               805   810   815

Asp Leu Lys Leu Leu Leu Asp Pro Thr His Trp Met Asp Ser Met Leu
           820   825   830

Gln Pro Val Glu Phe Glu Ser Ser Leu Arg Glu Met Cys Phe Asp Pro
       835   840   845

Asn Thr Lys Glu Lys Ala Val Asp Val Ile Ile Glu Ile Gly Pro His
   850   855   860

Gly Ala Leu Gly Gly Pro Ile Asn Gln Val Met Gln Asp Leu Gly Leu
865   870   875   880

Lys Gly Thr Asp Ile Asn Tyr Leu Ser Cys Leu Ser Arg Gly Arg Ser
           885   890   895

Ser Leu Glu Thr Met Tyr Arg Ala Ala Thr Glu Leu Ile Ser Lys Gly
       900   905   910

Tyr Gly Leu Lys Met Asp Ala Ile Asn Phe Pro His Gly Arg Lys Glu
          915   920   925

Pro Arg Val Lys Val Leu Ser Asp Leu Pro Ala Tyr Pro Trp Asn His
      930   935   940

Gln Thr Arg Tyr Trp Arg Glu Pro Arg Gly Ser Arg Glu Ser Lys Gln
945   950   955   960

Arg Thr His Pro Pro His Thr Leu Ile Gly Ser Arg Glu Ser Leu Ser
              965   970   975

Pro His Phe Ala Pro Lys Trp Lys His Val Leu Arg Leu Ser Asp Ile
          980   985   990

Pro Trp Ile Arg Asp His Val Val Gly Ser Ser Ile Ile Phe Pro Gly
          995   1000   1005

Ala Gly Phe Ile Ser Met Ala Ile Glu Gly Phe Ser Gln Val Cys
    1010   1015   1020

Pro Pro Val Ala Gly Ala Ser Ile Asn Tyr Asn Leu Arg Asp Val
    1025   1030   1035

Glu Leu Ala Gln Ala Leu Ile Ile Pro Ala Asp Ala Glu Ala Glu
    1040   1045   1050

Val Asp Leu Arg Leu Thr Ile Arg Ser Cys Glu Glu Arg Ser Leu
    1055   1060   1065

Gly Thr Lys Asn Trp His Gln Phe Ser Val His Ser Ile Ser Gly
    1070   1075   1080

Glu Asn Asn Thr Trp Thr Glu His Cys Thr Gly Leu Ile Arg Ser
    1085   1090   1095

Glu Ser Glu Arg Ser His Leu Asp Cys Ser Thr Val Glu Ala Ser
    1100   1105   1110

Arg Arg Leu Asn Leu Gly Ser Asp Asn Arg Ser Ile Asp Pro Asn
    1115   1120   1125

Asp Leu Trp Glu Ser Leu His Ala Asn Gly Ile Cys His Gly Pro
    1130   1135   1140

Ile Phe Gln Asn Ile Gln Arg Ile Gln Asn Asn Gly Gln Gly Ser
    1145   1150   1155

Phe Cys Arg Phe Ser Ile Ala Asp Thr Ala Ser Ala Met Pro His
    1160   1165   1170

Ser Tyr Glu Asn Arg His Ile Val His Pro Thr Thr Leu Asp Ser
    1175   1180   1185

Val Ile Gln Ala Ala Tyr Thr Val Leu Pro Tyr Ala Gly Thr Arg
    1190   1195   1200

Met Lys Thr Ala Met Val Pro Arg Arg Leu Arg Asn Val Lys Ile
    1205   1210   1215

Ser Ser Ser Leu Ala Asp Leu Glu Ala Gly Asp Ala Leu Asp Ala
    1220   1225   1230

Gln Ala Ser Ile Lys Asp Arg Asn Ser Gln Ser Phe Ser Thr Asp
    1235   1240   1245

Leu Ala Val Phe Asp Asp Tyr Asp Ser Gly Ser Ser Pro Ser Asp
    1250   1255   1260

Gly Ile Pro Val Ile Glu Ile Glu Gly Leu Val Phe Gln Ser Val
    1265   1270   1275

Gly Ser Ser Phe Ser Asp Gln Lys Ser Asp Ser Asn Asp Thr Glu
    1280   1285   1290

Asn Ala Cys Ser Ser Trp Val Trp Ala Pro Asp Ile Ser Leu Gly
    1295   1300   1305

Asp Ser Thr Trp Leu Lys Glu Lys Leu Ser Thr Glu Ala Glu Thr
    1310   1315   1320

Lys Glu Thr Glu Leu Met Met Asp Leu Arg Arg Cys Thr Ile Asn
    1325   1330   1335

Phe Ile Gln Glu Ala Val Thr Asp Leu Thr Asn Ser Asp Ile Gln
    1340   1345   1350

His Leu Asp Gly His Leu Gln Lys Tyr Phe Asp Trp Met Asn Val
    1355   1360   1365

Gln Leu Asp Leu Ala Arg Gln Asn Lys Leu Ser Pro Ala Ser Cys
    1370   1375   1380

Asp Trp Leu Ser Asp Asp Ala Glu Gln Lys Lys Cys Leu Gln Ala
    1385   1390   1395

Arg Val Ala Gly Glu Ser Val Asn Gly Glu Met Ile Ser Arg Leu
    1400   1405   1410

Gly Pro Gln Leu Ile Ala Met Leu Arg Arg Glu Thr Glu Pro Leu
    1415   1420   1425

Glu Leu Met Met Gln Asp Gln Leu Leu Ser Arg Tyr Tyr Val Asn
    1430   1435   1440

Ala Ile Lys Trp Ser Arg Ser Asn Ala Gln Ala Ser Glu Leu Ile
    1445   1450   1455

Arg Leu Cys Ala His Lys Asn Pro Arg Ser Arg Ile Leu Glu Ile
    1460   1465   1470

Gly Gly Gly Thr Gly Gly Cys Thr Lys Leu Ile Val Asn Ala Leu
    1475   1480   1485

Gly Asn Thr Lys Pro Ile Asp Arg Tyr Asp Phe Thr Asp Val Ser
    1490   1495   1500

Ala Gly Phe Phe Glu Ser Ala Arg Glu Gln Phe Ala Asp Trp Gln
    1505   1510   1515

Asp Val Met Thr Phe Lys Lys Leu Asp Ile Glu Ser Asp Pro Glu
    1520   1525   1530

Gln Gln Gly Phe Glu Cys Ala Thr Tyr Asp Val Val Val Ala Cys
    1535   1540   1545

Gln Val Leu His Ala Thr Arg Cys Met Lys Arg Thr Leu Ser Asn
    1550   1555   1560

Val Arg Lys Leu Leu Lys Pro Gly Gly Asn Leu Ile Leu Val Glu
    1565   1570   1575

Thr Thr Arg Asp Gln Leu Asp Leu Phe Phe Thr Phe Gly Leu Leu
    1580   1585   1590

Pro Gly Trp Trp Leu Ser Glu Glu Pro Glu Arg Lys Ser Thr Pro
    1595   1600   1605

Ser Leu Thr Thr Asp Leu Trp Asn Thr Met Leu Asp Thr Ser Gly
    1610   1615   1620

Phe Asn Gly Val Glu Leu Glu Val Arg Asp Cys Glu Asp Asp Glu
    1625   1630   1635

Phe Tyr Met Ile Ser Thr Met Leu Ser Thr Ala Arg Lys Glu Asn
    1640   1645   1650

Thr Thr Pro Asp Thr Val Ala Glu Ser Glu Val Leu Leu Leu His
    1655   1660   1665

Gly Ala Leu Arg Pro Pro Ser Ser Trp Leu Glu Ser Leu Gln Ala
    1670   1675   1680

Ala Ile Cys Glu Lys Thr Ser Ser Ser Pro Ser Ile Asn Ala Leu
    1685   1690   1695

Gly Glu Val Asp Thr Thr Gly Arg Thr Cys Ile Phe Leu Gly Glu
    1700   1705   1710

Met Glu Ser Ser Leu Leu Gly Glu Val Gly Ser Glu Thr Phe Lys
    1715   1720   1725

Ser Ile Thr Ala Met Leu Asn Asn Cys Asn Ala Leu Leu Trp Val
    1730   1735   1740

Ser Arg Gly Ala Ala Met Ser Ser Glu Asp Pro Trp Lys Ala Leu
    1745   1750   1755

His Ile Gly Leu Leu Arg Thr Ile Arg Asn Glu Asn Asn Gly Lys
    1760   1765   1770

Glu Tyr Val Ser Leu Asp Leu Asp Pro Ser Arg Asn Ala Tyr Thr
    1775   1780   1785

His Glu Ser Leu Tyr Ala Ile Cys Asn Ile Phe Asn Gly Arg Leu
    1790   1795   1800

Gly Asp Leu Ser Glu Asp Lys Glu Phe Glu Phe Ala Glu Arg Asn
    1805   1810   1815

Gly Val Ile His Val Pro Arg Leu Phe Asn Asp Pro His Trp Lys
    1820   1825   1830

Asp Gln Glu Ala Val Glu Val Thr Leu Gln Pro Phe Glu Gln Pro
    1835   1840   1845

Gly Arg Arg Leu Arg Met Glu Val Glu Thr Pro Gly Leu Leu Asp
    1850   1855   1860

Ser Leu Gln Phe Arg Asp Asp Glu Gly Arg Glu Gly Lys Asp Leu
    1865   1870   1875

Pro Asp Asp Trp Val Glu Ile Glu Pro Lys Ala Phe Gly Leu Asn
    1880   1885   1890

Phe Arg Asp Val Met Val Ala Met Gly Gln Leu Glu Ala Asn Arg
    1895   1900   1905

Val Met Gly Phe Glu Cys Ala Gly Val Ile Thr Lys Leu Gly Gly
    1910   1915   1920

Ala Ala Ala Ala Ser Gln Gly Leu Arg Leu Gly Asp Arg Val Cys
    1925   1930   1935

Ala Leu Leu Lys Gly His Trp Ala Thr Arg Thr Gln Thr Pro Tyr
    1940   1945   1950

Thr Asn Val Val Arg Ile Pro Asp Glu Met Gly Phe Pro Glu Ala
    1955   1960   1965

Ala Ser Val Pro Leu Ala Phe Thr Thr Ala Tyr Ile Ala Leu Tyr
    1970   1975   1980

Thr Thr Ala Lys Leu Arg Arg Gly Glu Arg Val Leu Ile His Ser
    1985   1990   1995

Gly Ala Gly Gly Val Gly Gln Ala Ala Ile Ile Leu Ser Gln Leu
     2000   2005   2010

Ala Gly Ala Glu Val Phe Val Thr Ala Gly Thr Gln Ala Lys Arg
     2015   2020   2025

Asp Phe Val Gly Asp Lys Phe Gly Ile Asn Pro Asp His Ile Phe
     2030   2035   2040

Ser Ser Arg Asn Asp Leu Phe Val Asp Gly Ile Lys Ala Tyr Thr
     2045   2050   2055

Gly Gly Leu Gly Val His Val Val Leu Asn Ser Leu Ala Gly Gln
     2060   2065   2070

Leu Leu Gln Ala Ser Phe Asp Cys Met Ala Glu Phe Gly Arg Phe
     2075   2080   2085

Val Glu Ile Gly Lys Lys Asp Leu Glu Gln Asn Ser Arg Leu Asp
     2090   2095   2100

Met Leu Pro Phe Thr Arg Asp Val Ser Phe Thr Ser Ile Asp Leu
     2105   2110   2115

Leu Ser Trp Gln Arg Ala Lys Ser Glu Glu Val Ser Glu Ala Leu
     2120   2125   2130

Asn His Val Thr Lys Leu Leu Glu Thr Lys Ala Ile Gly Leu Ile
     2135   2140   2145

Gly Pro Ile Gln Gln His Ser Leu Ser Asn Ile Glu Lys Ala Phe
     2150   2155   2160

Arg Thr Met Gln Ser Gly Gln His Val Gly Lys Val Val Val Asn
     2165   2170   2175

Val Ser Gly Asp Glu Leu Val Pro Val Gly Asp Gly Gly Phe Ser
     2180   2185   2190

Leu Lys Leu Lys Pro Asp Ser Ser Tyr Leu Val Ala Gly Gly Leu
     2195   2200   2205

Gly Gly Ile Gly Lys Gln Ile Cys Gln Trp Leu Val Asp His Gly
     2210   2215   2220

Ala Lys His Leu Ile Ile Leu Ser Arg Ser Ala Lys Ala Ser Pro
     2225   2230   2235

Phe Ile Thr Ser Leu Gln Asn Gln Gln Cys Ala Val Tyr Leu His
     2240   2245   2250

Ala Cys Asp Ile Ser Asp Gln Asp Gln Val Thr Lys Val Leu Arg
     2255   2260   2265

Leu Cys Glu Glu Ala His Ala Pro Pro Ile Arg Gly Ile Ile Gln
    2270   2275   .   .   2280

Gly Ala Met Val Leu Lys Asp Ala Leu Leu Ser Arg Met Thr Leu
    2285   2290   ·   2295

Asp Glu Phe Asn Ala Ala Thr Arg Pro Lys Val Gln Gly Ser Trp
    2300   2305   2310

Tyr Leu His Lys Ile Ala Gln Asp Val Asp Phe Phe Val Met Leu
    2315   2320   .   2325

Ser Ser Leu Val Gly Val Met Gly Gly Ala Gly Gln Ala Asn Tyr
    2330   2335   2340

Ala Ala Ala Gly Ala Phe Gln Asp Ala Leu Ala His His Arg Arg
    2345   2350   2355

Ala His Gly Met Pro Ala Val Thr Ile Asp Leu Gly Met Val Lys
    2360   2365   2370

Ser Val Gly Tyr Val Ala Glu Thr Gly Arg Gly Val Ala Asp Arg
    2375   2380   2385

Leu Ala Arg Ile Gly Tyr Lys Pro Met His Glu Lys Asp Val Met
    2390   .   2395   2400

```
Asp Val  Leu Glu Lys Ala Ile  Leu Cys Ser Ser Pro  Gln Phe Pro
    2405             2410             2415


Ser Pro  Pro Ala Ala Val Val  Thr Gly Ile Asn Thr  Ser Pro Gly
    2420             2425             2430


Ala His  Trp Thr Glu Ala Asn  Trp Ile Gln Glu Gln  Arg Phe Val
    2435             2440             2445


Gly Leu  Lys Tyr Arg Gln Val  Leu His Ala Asp Gln  Ser Phe Val
    2450             2455             2460


Ser Ser  His Lys Lys Gly Pro  Asp Gly Val Arg Ala  Gln Leu Ser
    2465             2470             2475


Arg Val  Thr Ser His Asp Glu  Ala Ile Ser Ile Val  Leu Lys Ala
    2480             2485             2490


Met Thr  Glu Lys Leu Met Arg  Met Phe Gly Leu Ala  Glu Asp Asp
    2495             2500             2505


Met Ser  Ser Ser Lys Asn Leu  Ala Gly Val Gly Val  Asp Ser Leu
    2510             2515             2520


Val Ala  Ile Glu Leu Arg Asn  Trp Ile Thr Ser Glu  Ile His Val
    2525             2530             2535
```

Asp Val Ser Ile Phe Glu Leu Met Asn Gly Asn Thr Ile Ala Gly
    2540   2545   · 2550

Leu Val Glu Leu Val Val Ala Lys Cys Ser
    2555   2560

<210> 47
<211> 1557
<212> DNA
<213> Penicillium citrinum

<220>
<221> CDS
<222> (1)..(1557)

<400> 47
atg ctc ggc cag gtt ctt ctg acc gtc gaa tcg tac caa tgg gta tcg   48
Met Leu Gly Gln Val Leu Leu Thr Val Glu Ser Tyr Gln Trp Val Ser
1   5   10   15

acc cct caa gcc ctt gtg gcg gtc gca gtg ctt ctt agt ctc atc gcc   96
Thr Pro Gln Ala Leu Val Ala Val Ala Val Leu Leu Ser Leu Ile Ala .
            20   25   30

tac cgt ttg cgg ggg cgc cag tcc gaa ctg caa gtc tat aat ccc aaa   144
Tyr Arg Leu Arg Gly Arg Gln Ser Glu Leu Gln Val Tyr Asn Pro Lys
        35   40   45

aaa tgg tgg gag ttg acg acc atg agg gct agg cag gac ttc gat acg   192
Lys Trp Trp Glu Leu Thr Thr Met Arg Ala Arg Gln Asp Phe Asp Thr
        50   55   60

tat ggt ccg agc tgg atc gaa gct tgg ttc tcg aaa aac gac aag ccc   240

Tyr Gly Pro Ser Trp Ile Glu Ala Trp Phe Ser Lys Asn Asp Lys Pro
65   70   75   80

ctg cgc ttc att gtt gat tcc ggc tat tgc acc atc ctc cca tcg tcc   288
Leu Arg Phe Ile Val Asp Ser Gly Tyr Cys Thr Ile Leu Pro Ser Ser
                85   90   95

atg gcc gac gag ttt cgg aaa atc aaa gat atg tgc atg tac aag ttt   336
Met Ala Asp Glu Phe Arg Lys Ile Lys Asp Met Cys Met Tyr Lys Phe
                100   105   110

ttg gcg gat gac ttt cac tct cat ctc cct gga ttc gac ggg ttc aag   384
Leu Ala Asp Asp Phe His Ser His Leu Pro Gly Phe Asp Gly Phe Lys
            115   120   125

gaa atc tgc cag gat gca cat ctt gtc aac aaa gtt gtt ttg aac cag   432
Glu Ile Cys Gln Asp Ala His Leu Val Asn Lys Val Val Leu Asn Gln
            130   135   140

tta caa acc caa gcc ccc aag tac aca aag cca ttg gct acc ttg gcc   480
Leu Gln Thr Gln Ala Pro Lys Tyr Thr Lys Pro Leu Ala Thr Leu Ala
145   150   155   160

gac gct act att gcc aag ttg ttc ggt aaa agc gag gag tgg caa acc   528
Asp Ala Thr Ile Ala Lys Leu Phe Gly Lys Ser Glu Glu Trp Gln Thr
                165   170   175

gca cct gtc tat tcc aat gga ttg gac ctt gtc aca cga aca gtc aca   576
Ala Pro Val Tyr Ser Asn Gly Leu Asp Leu Val Thr Arg Thr Val Thr
                180   185   190

ctc att atg gtc ggc gac aaa atc tgc cac aat gag gag tgg ctg gat   624
Leu Ile Met Val Gly Asp Lys Ile Cys His Asn Glu Glu Trp Leu Asp
                195   200   205

att gca aag aac cat gcc gtg agt gtg gcg gta caa gct cgc caa ctt   672

```
Ile Ala Lys Asn His Ala Val Ser Val Ala Val Gln Ala Arg Gln Leu
    210             215             220

cgc gta tgg ccc atg cta ctg cga ccg ctc gct cac tgg ttt caa ccg        720
Arg Val Trp Pro Met Leu Leu Arg Pro Leu Ala His Trp Phe Gln Pro
225             230             235             240

caa gga cgc aaa ttg cgt gac caa gtg cgc cgc gca cga aag atc att        768
Gln Gly Arg Lys Leu Arg Asp Gln Val Arg Arg Ala Arg Lys Ile Ile
                245             250             255

gat cct gag att cag cga cga cgt gct gaa aag gcc gca tgt gta gcg        816
Asp Pro Glu Ile Gln Arg Arg Arg Ala Glu Lys Ala Ala Cys Val Ala
                260             265             270

aag ggc gtg cag ccg ccc cag tac gtc gat acc atg caa tgg ttt gaa        864
Lys Gly Val Gln Pro Pro Gln Tyr Val Asp Thr Met Gln Trp Phe Glu
            275             280             285

gac acc gcc gac ggc cgc tgg tac gat gtg gcg ggt gct cag ctc gct        912
Asp Thr Ala Asp Gly Arg Trp Tyr Asp Val Ala Gly Ala Gln Leu Ala
    290             295             300

atg gat ttc gcc ggc atc tac gcc tcg acg gat ctt ttc gtc ggt gcc        960
Met Asp Phe Ala Gly Ile Tyr Ala Ser Thr Asp Leu Phe Val Gly Ala
305             310             315             320

ctt gtg gac att gcc agg cac cca gac ctt att cag cct ctc cgc caa       1008
Leu Val Asp Ile Ala Arg His Pro Asp Leu Ile Gln Pro Leu Arg Gln
                325             330             335

gag atc cgc act gta atc gga gaa ggg ggc tgg acg cct gcc tct ctg       1056
Glu Ile Arg Thr Val Ile Gly Glu Gly Gly Trp Thr Pro Ala Ser Leu
                340             345             350

ttc aag ctg aag ctc ctc gac agc tgc atg aaa gag acg cag cga atc       1104
```

Phe Lys Leu Lys Leu Leu Asp Ser Cys Met Lys Glu Thr Gln Arg Ile
    355   360   365

aag ccg gtc gag tgc gcc act atg cgc agt acc gct ctc aga gac atc   1152
Lys Pro Val Glu Cys Ala Thr Met Arg Ser Thr Ala Leu Arg Asp Ile
    370   375   380

act cta tcc aat ggc ctc ttc att ccc aag ggc gag ttg gcc gct gtg   1200
Thr Leu Ser Asn Gly Leu Phe Ile Pro Lys Gly Glu Leu Ala Ala Val
385   390   395   400

gct gca gac cgc atg aac aac cct gat gtg tgg gaa aac ccc gaa aat   1248
Ala Ala Asp Arg Met Asn Asn Pro Asp Val Trp Glu Asn Pro Glu Asn
                405   410   415

tat gat ccc tac cga ttt atg cgc atg cgc gag gat cca gac aag gcc   1296
Tyr Asp Pro Tyr Arg Phe Met Arg Met Arg Glu Asp Pro Asp Lys Ala
                420   425   430

ttc acc gct caa ttg gag aat acc aac ggt gat cac atc ggc ttc ggc   1344
Phe Thr Ala Gln Leu Glu Asn Thr Asn Gly Asp His Ile Gly Phe Gly
            435   440   445

tgg aac cca cgc gct tgt ccc ggg cgg ttc ttc gcc tcg aag gaa atc   1392
Trp Asn Pro Arg Ala Cys Pro Gly Arg Phe Phe Ala Ser Lys Glu Ile
    450   455   460

aag att ctc ctc gct cat ata ctg att cag tat gat gtg aag cct gta   1440
Lys Ile Leu Leu Ala His Ile Leu Ile Gln Tyr Asp Val Lys Pro Val
465   470   475   480

cca gga gac gat gac aaa tac tac cgt cac gct ttt agc gtt cgt atg   1488
Pro Gly Asp Asp Asp Lys Tyr Tyr Arg His Ala Phe Ser Val Arg Met
                485   490   495

cat cca acc aca aag ctc atg gta cgc cgg cgc aac gag gac atc ccg   1536

His Pro Thr Thr Lys Leu Met Val Arg Arg Arg Asn Glu Asp Ile Pro
        500   505   510

ctc cct cat gac cgg tgc taa   1557
Leu Pro His Asp Arg Cys
        515

<210> 48
<211> 518
<212> PRT
<213> Penicillium citrinum

<400> 48

Met Leu Gly Gln Val Leu Leu Thr Val Glu Ser Tyr Gln Trp Val Ser
1   5   10   15

Thr Pro Gln Ala Leu Val Ala Val Ala Val Leu Leu Ser Leu Ile Ala
            20   25   30

Tyr Arg Leu Arg Gly Arg Gln Ser Glu Leu Gln Val Tyr Asn Pro Lys
        35   40   45

Lys Trp Trp Glu Leu Thr Thr Met Arg Ala Arg Gln Asp Phe Asp Thr
    50   55   60

Tyr Gly Pro Ser Trp Ile Glu Ala Trp Phe Ser Lys Asn Asp Lys Pro
65   70   75   80

Leu Arg Phe Ile Val Asp Ser Gly Tyr Cys Thr Ile Leu Pro Ser Ser

Met Ala Asp Glu Phe Arg Lys Ile Lys Asp Met Cys Met Tyr Lys Phe
          100   105   110

Leu Ala Asp Asp Phe His Ser His Leu Pro Gly Phe Asp Gly Phe Lys
          115   120   125

Glu Ile Cys Gln Asp Ala His Leu Val Asn Lys Val Val Leu Asn Gln
      130   135   140

Leu Gln Thr Gln Ala Pro Lys Tyr Thr Lys Pro Leu Ala Thr Leu Ala
145   150   155   160

Asp Ala Thr Ile Ala Lys Leu Phe Gly Lys Ser Glu Glu Trp Gln Thr
              165   170   175

Ala Pro Val Tyr Ser Asn Gly Leu Asp Leu Val Thr Arg Thr Val Thr
              180   185   190

Leu Ile Met Val Gly Asp Lys Ile Cys His Asn Glu Glu Trp Leu Asp
          195   200   205

Ile Ala Lys Asn His Ala Val Ser Val Ala Val Gln Ala Arg Gln Leu
      210   215   220

Arg Val Trp Pro Met Leu Leu Arg Pro Leu Ala His Trp Phe Gln Pro

```
           225                230                235                240


Gln Gly Arg Lys Leu Arg Asp Gln Val Arg Arg Ala Arg Lys Ile Ile
                245                250                255



Asp Pro Glu Ile Gln Arg Arg Arg Ala Glu Lys Ala Ala Cys Val Ala
            260                265                270



Lys Gly Val Gln Pro Pro Gln Tyr Val Asp Thr Met Gln Trp Phe Glu
            275                280                285



Asp Thr Ala Asp Gly Arg Trp Tyr Asp Val Ala Gly Ala Gln Leu Ala
        290                295                300



Met Asp Phe Ala Gly Ile Tyr Ala Ser Thr Asp Leu Phe Val Gly Ala
305                310                315                320



Leu Val Asp Ile Ala Arg His Pro Asp Leu Ile Gln Pro Leu Arg Gln
                325                330                335



Glu Ile Arg Thr Val Ile Gly Glu Gly Gly Trp Thr Pro Ala Ser Leu
            340                345                350



Phe Lys Leu Lys Leu Leu Asp Ser Cys Met Lys Glu Thr Gln Arg Ile
            355                360                365



Lys Pro Val Glu Cys Ala Thr Met Arg Ser Thr Ala Leu Arg Asp Ile
```

Thr Leu Ser Asn Gly Leu Phe Ile Pro Lys Gly Glu Leu Ala Ala Val
385   390   395   400

Ala Ala Asp Arg Met Asn Asn Pro Asp Val Trp Glu Asn Pro Glu Asn
                    405   410   415

Tyr Asp Pro Tyr Arg Phe Met Arg Met Arg Glu Asp Pro Asp Lys Ala
                    420   425   430

Phe Thr Ala Gln Leu Glu Asn Thr Asn Gly Asp His Ile Gly Phe Gly
                    435   440   445

Trp Asn Pro Arg Ala Cys Pro Gly Arg Phe Phe Ala Ser Lys Glu Ile
                    450   455   460

Lys Ile Leu Leu Ala His Ile Leu Ile Gln Tyr Asp Val Lys Pro Val
465   470   475   480

Pro Gly Asp Asp Asp Lys Tyr Tyr Arg His Ala Phe Ser Val Arg Met
                    485   490   495

His Pro Thr Thr Lys Leu Met Val Arg Arg Arg Asn Glu Asp Ile Pro
                    500   505   510

Leu Pro His Asp Arg Cys

515

<210> 49
<211> 3522
<212> DNA
<213> Penicillium citrinum

<220>
<221> CDS
<222> (1)..(3522)

<400> 49

atg	gtc	gct	tcg	ttg	cta	ccc	tct	cgc	ttt	cgc	ggt	agg	gaa	tca	atg	48
Met	Val	Ala	Ser	Leu	Leu	Pro	Ser	Arg	Phe	Arg	Gly	Arg	Glu	Ser	Met	
1				5				10					15			

aat	cag	cag	cac	cct	cta	cgc	tcg	gga	aat	cgg	gca	ttg	acc	tcc	aca	96
Asn	Gln	Gln	His	Pro	Leu	Arg	Ser	Gly	Asn	Arg	Ala	Leu	Thr	Ser	Thr	
		20					25					30				

ctc	caa	ttt	cta	tcc	aaa	acg	gcg	tgt	cta	cac	ccg	atc	cat	acc	gtt	144
Leu	Gln	Phe	Leu	Ser	Lys	Thr	Ala	Cys	Leu	His	Pro	Ile	His	Thr	Val	
		35					40					45				

tgc	acc	ata	gct	att	cta	gct	agt	acc	aca	tac	gtt	gga	cta	ctc	aaa	192
Cys	Thr	Ile	Ala	Ile	Leu	Ala	Ser	Thr	Thr	Tyr	Val	Gly	Leu	Leu	Lys	
	50					55					60					

gac	agc	ttc	ttc	cat	ggc	ccc	gca	aac	gtt	gat	aaa	gca	gaa	tgg	ggc	240
Asp	Ser	Phe	Phe	His	Gly	Pro	Ala	Asn	Val	Asp	Lys	Ala	Glu	Trp	Gly	
65					70					75					80	

tct	ttg	gtc	gaa	gga	agt	cga	agc	ttg	atc	acc	ggc	cca	cag	aat	ggc	288
Ser	Leu	Val	Glu	Gly	Ser	Arg	Ser	Leu	Ile	Thr	Gly	Pro	Gln	Asn	Gly	
				85					90					95		

```
tgg aag tgg cag agc ttc gac ggg gat gca gat gtt ctc gga gat ttc          336
Trp Lys Trp Gln Ser Phe Asp Gly Asp Ala Asp Val Leu Gly Asp Phe
            100             105             110


aac cat caa gca cta atg acc ttg gta ttc ccg ggg tca tat ggg gtt          384
Asn His Gln Ala Leu Met Thr Leu Val Phe Pro Gly Ser Tyr Gly Val
            115             120             125


gca tct caa gca gcc tca cca ttc ctt gct ccc ctc cct gtg aac cta          432
Ala Ser Gln Ala Ala Ser Pro Phe Leu Ala Pro Leu Pro Val Asn Leu
            130             135             140


tct gtg att gac ctt ccc tca acg tcg agc cct tta acc gcc tat tcg          480
Ser Val Ile Asp Leu Pro Ser Thr Ser Ser Pro Leu Thr Ala Tyr Ser
145             150             155             160


aaa gat aaa gtt ttc gcc ttc tct gtg gaa tac agc agc gcg ccg gaa          528
Lys Asp Lys Val Phe Ala Phe Ser Val Glu Tyr Ser Ser Ala Pro Glu
            165             170             175


ctc gtg gct gct gtt caa gaa atc ccc aac aac agt gcc gac ctg aaa          576
Leu Val Ala Ala Val Gln Glu Ile Pro Asn Asn Ser Ala Asp Leu Lys
            180             185             190


ttg cag gag acg caa ttg atc gag atg gaa cgc cag atg tgg atc atg          624
Leu Gln Glu Thr Gln Leu Ile Glu Met Glu Arg Gln Met Trp Ile Met
            195             200             205


aag gct gcc agg gct cac aca aaa cgc agc ctt gct caa tgg gtg cac          672
Lys Ala Ala Arg Ala His Thr Lys Arg Ser Leu Ala Gln Trp Val His
            210             215             220


gat acc tgg aca gag tct ctt gat ctt atc aag agc gct caa acg ctc          720
Asp Thr Trp Thr Glu Ser Leu Asp Leu Ile Lys Ser Ala Gln Thr Leu
225             230             235             240
```

```
gac gtg gtt gtc atg gtg cta ggt tat ata tca atg cac ttg act ttc          768
Asp Val Val Val Met Val Leu Gly Tyr Ile Ser Met His Leu Thr Phe
                245                 250                 255


gtc tca ctc ttc ctc agc atg aaa aaa ttg gga tcg aag gtt tgg ctg          816
Val Ser Leu Phe Leu Ser Met Lys Lys Leu Gly Ser Lys Val Trp Leu
                260                 265                 270


gct aca agc gtc ctt ttg tcg tca aca ttt gcc ttt ctc ctc ggt ctc         864
Ala Thr Ser Val Leu Leu Ser Ser Thr Phe Ala Phe Leu Leu Gly Leu
                275                 280                 285


gac gtg gcc ata aga cta ggg gtt ccg atg agc atg agg ttg cta tcc          912
Asp Val Ala Ile Arg Leu Gly Val Pro Met Ser Met Arg Leu Leu Ser
        290                 295                 300


gaa ggc ctc ccc ttc ttg gtg gtg atc gtt ggc ttt gag aag agc atc         960
Glu Gly Leu Pro Phe Leu Val Val Ile Val Gly Phe Glu Lys Ser Ile
305                 310                 315                 320


act ctg acc agg gct gtt ttg tcc tat gct gtg cag cac cga aag ccc         1008
Thr Leu Thr Arg Ala Val Leu Ser Tyr Ala Val Gln His Arg Lys Pro
                325                 330                 335


cag aag ata cag tct gac cag ggt agc gtg aca gcc att gct gaa agt         1056
Gln Lys Ile Gln Ser Asp Gln Gly Ser Val Thr Ala Ile Ala Glu Ser
                340                 345                 350


acc atc aat tac gcc gta cga agc gcc att cgg gag aag ggt tac aat         1104
Thr Ile Asn Tyr Ala Val Arg Ser Ala Ile Arg Glu Lys Gly Tyr Asn
                355                 360                 365


atc gtg tgc cac tac gtg gtc gag atc ctg ctc cta gtt atc ggt gct         1152
Ile Val Cys His Tyr Val Val Glu Ile Leu Leu Leu Val Ile Gly Ala
        370                 375                 380
```

```
gtc tta ggc atc caa ggt ggg cta cag cac ttc tgt gtt cta gct gca        1200
Val Leu Gly Ile Gln Gly Gly Leu Gln His Phe Cys Val Leu Ala Ala
385             390             395             400


ttg atc ctg ttc ttt gac tgt ctg ctg ctg ttt aca ttc tac act gcg        1248
Leu Ile Leu Phe Phe Asp Cys Leu Leu Leu Phe Thr Phe Tyr Thr Ala
                405             410             415


att ctg tct atc aag ctc gag gta aac cgc ctc aaa cgt cat atc aac        1296
Ile Leu Ser Ile Lys Leu Glu Val Asn Arg Leu Lys Arg His Ile Asn
                420             425             430


atg cgg tac gcg ttg gaa gat gag ggt ctc agt cag cgg acg gcg gag        1344
Met Arg Tyr Ala Leu Glu Asp Glu Gly Leu Ser Gln Arg Thr Ala Glu
            435             440             445


agt gtc gcg acc agc aat gat gcc caa gac agt gca cgt aca tat ctg        1392
Ser Val Ala Thr Ser Asn Asp Ala Gln Asp Ser Ala Arg Thr Tyr Leu
            450             455             460


ttt ggc aat gat atg aaa ggc agc agt gtt ccg aag ttc aaa ttc tgg        1440
Phe Gly Asn Asp Met Lys Gly Ser Ser Val Pro Lys Phe Lys Phe Trp
465             470             475             480


atg gtc gtt ggt ttc ctt atc gtc aac ctc gtc aac atc ggc tcc acc        1488
Met Val Val Gly Phe Leu Ile Val Asn Leu Val Asn Ile Gly Ser Thr
                485             490             495


ctt ttc caa gcc tct tct agt gga tcg ttg tcc agt ata tca tct tgg        1536
Leu Phe Gln Ala Ser Ser Ser Gly Ser Leu Ser Ser Ile Ser Ser Trp
                500             505             510


acc gaa agt ctg agc gga tcg gcc att aaa ccc ccg ctt gag ccc ttc        1584
Thr Glu Ser Leu Ser Gly Ser Ala Ile Lys Pro Pro Leu Glu Pro Phe
                515             520             525
```

```
aag gta gct gga agt gga cta gat gaa cta ctt ttc cag gca aga ggg        1632
Lys Val Ala Gly Ser Gly Leu Asp Glu Leu Leu Phe Gln Ala Arg Gly
        530             535             540


cgc ggt caa tcg act atg gtc act gtc ctc gcc ccc atc aag tac gaa        1680
Arg Gly Gln Ser Thr Met Val Thr Val Leu Ala Pro Ile Lys Tyr Glu
545             550             555             560


cta gag tat cct tcc att cac cgt ggt acc tcg cag cta cac gag tat        1728
Leu Glu Tyr Pro Ser Ile His Arg Gly Thr Ser Gln Leu His Glu Tyr
            565             570             575


gga gtt ggt gga aaa atg gtc ggt agc ctg ctc acc agc ctg gaa gat        1776
Gly Val Gly Gly Lys Met Val Gly Ser Leu Leu Thr Ser Leu Glu Asp
            580             585             590


ccc gtc ctc tcc aaa tgg gtg ttt gtg gca ctt gcc cta agt gtc gct        1824
Pro Val Leu Ser Lys Trp Val Phe Val Ala Leu Ala Leu Ser Val Ala
            595             600             605


ctg aac agc tat ctg ttc aag gcc gcc aga ctg gga atc aaa gat cct        1872
Leu Asn Ser Tyr Leu Phe Lys Ala Ala Arg Leu Gly Ile Lys Asp Pro
        610             615             620


aat ctc ccg agt cac cca gtt gat cca gtt gag ctt gac cag gcc gaa        1920
Asn Leu Pro Ser His Pro Val Asp Pro Val Glu Leu Asp Gln Ala Glu
625             630             635             640


agc ttc aac gct gcc cag aac cag acc cct cag att caa tca agt ctc        1968
Ser Phe Asn Ala Ala Gln Asn Gln Thr Pro Gln Ile Gln Ser Ser Leu
                645             650             655


caa gct cct cag acc aga gtg ttc act cct acc acc acc gac agt gac        2016
Gln Ala Pro Gln Thr Arg Val Phe Thr Pro Thr Thr Thr Asp Ser Asp
            660             665             670
```

```
agt gat gcc tca tta gtc tta att aaa gca tct cta aag gtc act aag        2064
Ser Asp Ala Ser Leu Val Leu Ile Lys Ala Ser Leu Lys Val Thr Lys
        675                 680                 685


cga gca gaa gga aag aca gcc act agt gaa ctt ccc gtg tct cgc aca        2112
Arg Ala Glu Gly Lys Thr Ala Thr Ser Glu Leu Pro Val Ser Arg Thr
        690                 695                 700


caa atc gaa ctg gac aat ttg ctg aag cag aac aca atc agc gag ttg        2160
Gln Ile Glu Leu Asp Asn Leu Leu Lys Gln Asn Thr Ile Ser Glu Leu
705                 710                 715                 720


aac gat gag gat gtc gtt gcc ttg tct ttg cgg gga aag gtt ccc ggg        2208
Asn Asp Glu Asp Val Val Ala Leu Ser Leu Arg Gly Lys Val Pro Gly
                725                 730                 735


tat gcc cta gag aag agt ctc aaa gac tgc act cgt gcc gtc aag gtt        2256
Tyr Ala Leu Glu Lys Ser Leu Lys Asp Cys Thr Arg Ala Val Lys Val
                740                 745                 750


cgc cgc tct atc att tcg agg aca ccg gct acc gca gag ctt aca agt        2304
Arg Arg Ser Ile Ile Ser Arg Thr Pro Ala Thr Ala Glu Leu Thr Ser
        755                 760                 765


atg ctg gag cac tcg aag ctg ccg tac gaa aac tac gcc tgg gaa cgc        2352
Met Leu Glu His Ser Lys Leu Pro Tyr Glu Asn Tyr Ala Trp Glu Arg
        770                 775                 780


gtg ctc ggt gca tgt tgc gag aac gtt att ggc tat atg cca gtc cct        2400
Val Leu Gly Ala Cys Cys Glu Asn Val Ile Gly Tyr Met Pro Val Pro
785                 790                 795                 800


gtt ggc gtc gcc ggt cct att gtt atc gac ggc aag agt tat ttc att        2448
Val Gly Val Ala Gly Pro Ile Val Ile Asp Gly Lys Ser Tyr Phe Ile
                805                 810                 815
```

```
cct atg gca acc acc gag ggc gtc ctc gtc gct agt gct agc cgt ggc      2496
Pro Met Ala Thr Thr Glu Gly Val Leu Val Ala Ser Ala Ser Arg Gly
        820               825               830


agt aag gca atc aac ctc ggt ggc ggt gcc gtg aca gtc ctg act ggc      2544
Ser Lys Ala Ile Asn Leu Gly Gly Gly Ala Val Thr Val Leu Thr Gly
        835               840               845


gac ggt atg aca cga ggc ccg tgt gtg aag ttt gat gtc ctt gaa cga      2592
Asp Gly Met Thr Arg Gly Pro Cys Val Lys Phe Asp Val Leu Glu Arg
        850               855               860


gct ggt gct gct aag atc tgg ctc gat tcg gac gtc ggc cag acc gta      2640
Ala Gly Ala Ala Lys Ile Trp Leu Asp Ser Asp Val Gly Gln Thr Val
.865               870               875               880


atg aaa gaa gcc ttc aat tca acc agc aga ttt gcg cgc tta caa agt      2688
Met Lys Glu Ala Phe Asn Ser Thr Ser Arg Phe Ala Arg Leu Gln Ser
                885               890               895


atg cgg aca act atc gcc ggt act cac tta tat att cga ttt aag act      2736
Met Arg Thr Thr Ile Ala Gly Thr His Leu Tyr Ile Arg Phe Lys Thr
                900               905               910


act act ggc gac gct atg gga atg aat atg att tct aag ggc gtg gag      2784
Thr Thr Gly Asp Ala Met Gly Met Asn Met Ile Ser Lys Gly Val Glu
                915               920               925


cat gca ctg aat gtt atg gcg aca gag gca ggt ttc agc gat atg aat      2832
His Ala Leu Asn Val Met Ala Thr Glu Ala Gly Phe Ser Asp Met Asn
        930               935               940


att att acc cta tca gga aat tac tgt acg gat aag aaa cct tca gct      2880
Ile Ile Thr Leu Ser Gly Asn Tyr Cys Thr Asp Lys Lys Pro Ser Ala
945               950               955               960
```

```
ttg aat tgg atc gat gga cgg ggc aag ggc att gtg gcc gaa gcc atc        2928
Leu Asn Trp Ile Asp Gly Arg Gly Lys Gly Ile Val Ala Glu Ala Ile
                965                 970                 975


ata ccg gcg aac gtt gtc agg gat gtc tta aag agc gat gtg gat agc        2976
Ile Pro Ala Asn Val Val Arg Asp Val Leu Lys Ser Asp Val Asp Ser
            980                 985                 990


atg gtt cag ctc aac ata tcg aaa  aat ctg att ggg tcc  gct atg gct      3024
Met Val Gln Leu Asn Ile Ser Lys  Asn Leu Ile Gly Ser  Ala Met Ala      -
        995                 1000                1005


ggc tca  gtt ggc ggc ttc aac  gcc caa gct gcc aat  ctt gcg gca         3069
Gly Ser  Val Gly Gly Phe Asn  Ala Gln Ala Ala Asn  Leu Ala Ala
     1010                1015                1020


gcc att  ttc att gcc aca ggt  cag gat ccg gcg caa  gtt gtg gag         3114
Ala Ile  Phe Ile Ala Thr Gly  Gln Asp Pro Ala Gln  Val Val Glu
     1025                1030                1035


agc gct  aac tgc atc act ctc  atg aac aat ctt cgc  gga tcg ctt         3159
Ser Ala  Asn Cys Ile Thr Leu  Met Asn Asn Leu Arg  Gly Ser Leu
     1040                1045                1050


caa atc  tct gtc tcc atg ccg  tct att gag gtt gga  acg ttg ggc         3204
Gln Ile  Ser Val Ser Met Pro  Ser Ile Glu Val Gly  Thr Leu Gly
     1055                1060                1065


ggt ggt  acg att ctg gag ccc  cag ggc gca atg ctt  gac atg ctt         3249
Gly Gly  Thr Ile Leu Glu Pro  Gln Gly Ala Met Leu  Asp Met Leu
     1070                1075                1080


ggt gtc  cgc gga tca cac ccg  acc act ccc ggt gag  aat gca cgt         3294
Gly Val  Arg Gly Ser His Pro  Thr Thr Pro Gly Glu  Asn Ala Arg
     1085                1090                1095
```

```
caa ctt  gcg cgc atc atc gga  agc gct gtt ttg gct  ggg gag ctc      3339
Gln Leu Ala Arg Ile Ile Gly  Ser Ala Val Leu Ala  Gly Glu Leu
    1100             1105             1110


tcg cta  tgt gct gcc cta gcc  gcc ggt cac ctg gtc  aag gcg cac      3384
Ser Leu Cys Ala Ala Leu Ala  Ala Gly His Leu Val  Lys Ala His
    1115             1120             1125


atg gcg  cac aac cgt tct gcc  ccg gca tct tca gcc  cct tct cga      3429
Met Ala His Asn Arg Ser Ala  Pro Ala Ser Ser Ala  Pro Ser Arg
    1130             1135             1140


agt gtc  tcc ccg tca ggc gga  acc agg aca gtc cct  gtt cct aac      3474
Ser Val Ser Pro Ser Gly Gly  Thr Arg Thr Val Pro  Val Pro Asn
    1145             1150             1155


aat gca  ctg agg ccg agt gct  gca gct act gat cgg  gct cga cgc      3519
Asn Ala Leu Arg Pro Ser Ala  Ala Ala Thr Asp Arg  Ala Arg Arg
    1160             1165             1170


tga                                                                 3522


<210>  50
<211>  1173
<212>  PRT
<213>  Penicillium citrinum


<400>  50


Met Val Ala Ser Leu Leu Pro Ser Arg Phe Arg Gly Arg Glu Ser Met
1               5                   10                  15



Asn Gln Gln His Pro Leu Arg Ser Gly Asn Arg Ala Leu Thr Ser Thr
```

```
                    20                      25                          30


Leu Gln Phe Leu Ser Lys Thr Ala Cys Leu His Pro Ile His Thr Val
            35                  40                  45


Cys Thr Ile Ala Ile Leu Ala Ser Thr Thr Tyr Val Gly Leu Leu Lys
            50                  55                  60


Asp Ser Phe Phe His Gly Pro Ala Asn Val Asp Lys Ala Glu Trp Gly
65                      70                  75                  80


Ser Leu Val Glu Gly Ser Arg Ser Leu Ile Thr Gly Pro Gln Asn Gly
                85                  90                  95


Trp Lys Trp Gln Ser Phe Asp Gly Asp Ala Asp Val Leu Gly Asp Phe
                100                 105                 110


Asn His Gln Ala Leu Met Thr Leu Val Phe Pro Gly Ser Tyr Gly Val
            115                 120                 125


Ala Ser Gln Ala Ala Ser Pro Phe Leu Ala Pro Leu Pro Val Asn Leu
            130                 135                 140


Ser Val Ile Asp Leu Pro Ser Thr Ser Ser Pro Leu Thr Ala Tyr Ser
145                     150                 155                 160


Lys Asp Lys Val Phe Ala Phe Ser Val Glu Tyr Ser Ser Ala Pro Glu
```

Leu Val Ala Ala Val Gln Glu Ile Pro Asn Asn Ser Ala Asp Leu Lys
        180   185   190

Leu Gln Glu Thr Gln Leu Ile Glu Met Glu Arg Gln Met Trp Ile Met
        195   200   205

Lys Ala Ala Arg Ala His Thr Lys Arg Ser Leu Ala Gln Trp Val His
        210   215   220

Asp Thr Trp Thr Glu Ser Leu Asp Leu Ile Lys Ser Ala Gln Thr Leu
225   230   235   240

Asp Val Val Val Met Val Leu Gly Tyr Ile Ser Met His Leu Thr Phe
            245   250   255

Val Ser Leu Phe Leu Ser Met Lys Lys Leu Gly Ser Lys Val Trp Leu
        260   265   270

Ala Thr Ser Val Leu Leu Ser Ser Thr Phe Ala Phe Leu Leu Gly Leu
        275   280   285

Asp Val Ala Ile Arg Leu Gly Val Pro Met Ser Met Arg Leu Leu Ser
        290   295   300

Glu Gly Leu Pro Phe Leu Val Val Ile Val Gly Phe Glu Lys Ser Ile

Thr Leu Thr Arg Ala Val Leu Ser Tyr Ala Val Gln His Arg Lys Pro
          325   330   335

Gln Lys Ile Gln Ser Asp Gln Gly Ser Val Thr Ala Ile Ala Glu Ser
          340   345   350

Thr Ile Asn Tyr Ala Val Arg Ser Ala Ile Arg Glu Lys Gly Tyr Asn
          355   360   365

Ile Val Cys His Tyr Val Val Glu Ile Leu Leu Leu Val Ile Gly Ala
          370   375   380

Val Leu Gly Ile Gln Gly Gly Leu Gln His Phe Cys Val Leu Ala Ala
385   390   395   400

Leu Ile Leu Phe Phe Asp Cys Leu Leu Leu Phe Thr Phe Tyr Thr Ala
          405   410   415

Ile Leu Ser Ile Lys Leu Glu Val Asn Arg Leu Lys Arg His Ile Asn
          420   425   430

Met Arg Tyr Ala Leu Glu Asp Glu Gly Leu Ser Gln Arg Thr Ala Glu
          435   440   445

Ser Val Ala Thr Ser Asn Asp Ala Gln Asp Ser Ala Arg Thr Tyr Leu

```
        450                 455                 460


Phe Gly Asn Asp Met Lys Gly Ser Ser Val Pro Lys Phe Lys Phe Trp
465                 470                 475                 480


Met Val Val Gly Phe Leu Ile Val Asn Leu Val Asn Ile Gly Ser Thr
                485                 490                 495


Leu Phe Gln Ala Ser Ser Ser Gly Ser Leu Ser Ser Ile Ser Ser Trp
                500                 505                 510


Thr Glu Ser Leu Ser Gly Ser Ala Ile Lys Pro Pro Leu Glu Pro Phe
            515                 520                 525


Lys Val Ala Gly Ser Gly Leu Asp Glu Leu Leu Phe Gln Ala Arg Gly
        530                 535                 540


Arg Gly Gln Ser Thr Met Val Thr Val Leu Ala Pro Ile Lys Tyr Glu
545                 550                 555                 560


Leu Glu Tyr Pro Ser Ile His Arg Gly Thr Ser Gln Leu His Glu Tyr
                565                 570                 575


Gly Val Gly Gly Lys Met Val Gly Ser Leu Leu Thr Ser Leu Glu Asp
            580                 585                 590


Pro Val Leu Ser Lys Trp Val Phe Val Ala Leu Ala Leu Ser Val Ala
```

Leu Asn Ser Tyr Leu Phe Lys Ala Ala Arg Leu Gly Ile Lys Asp Pro
    610   615   620

Asn Leu Pro Ser His Pro Val Asp Pro Val Glu Leu Asp Gln Ala Glu
625   630   635   640

Ser Phe Asn Ala Ala Gln Asn Gln Thr Pro Gln Ile Gln Ser Ser Leu
            645   650   655

Gln Ala Pro Gln Thr Arg Val Phe Thr Pro Thr Thr Thr Asp Ser Asp
        660   665   670

Ser Asp Ala Ser Leu Val Leu Ile Lys Ala Ser Leu Lys Val Thr Lys
        675   680   685

Arg Ala Glu Gly Lys Thr Ala Thr Ser Glu Leu Pro Val Ser Arg Thr
    690   695   700

Gln Ile Glu Leu Asp Asn Leu Leu Lys Gln Asn Thr Ile Ser Glu Leu
705   710   715   720

Asn Asp Glu Asp Val Val Ala Leu Ser Leu Arg Gly Lys Val Pro Gly
            725   730   735

Tyr Ala Leu Glu Lys Ser Leu Lys Asp Cys Thr Arg Ala Val Lys Val

740   745   750

Arg Arg Ser Ile Ile Ser Arg Thr Pro Ala Thr Ala Glu Leu Thr Ser
        755   760   765

Met Leu Glu His Ser Lys Leu Pro Tyr Glu Asn Tyr Ala Trp Glu Arg
    770   775   780

Val Leu Gly Ala Cys Cys Glu Asn Val Ile Gly Tyr Met Pro Val Pro
785   790   795   800
                                  /

Val Gly Val Ala Gly Pro Ile Val Ile Asp Gly Lys Ser Tyr Phe Ile
            805   810   815

Pro Met Ala Thr Thr Glu Gly Val Leu Val Ala Ser Ala Ser Arg Gly
            820   825   830

Ser Lys Ala Ile Asn Leu Gly Gly Gly Ala Val Thr Val Leu Thr Gly
        835   840   845

Asp Gly Met Thr Arg Gly Pro Cys Val Lys Phe Asp Val Leu Glu Arg
    850   855   860

Ala Gly Ala Ala Lys Ile Trp Leu Asp Ser Asp Val Gly Gln Thr Val
865   870   875   880

Met Lys Glu Ala Phe Asn Ser Thr Ser Arg Phe Ala Arg Leu Gln Ser

Met Arg Thr Thr Ile Ala Gly Thr His Leu Tyr Ile Arg Phe Lys Thr
              900   905   910

Thr Thr Gly Asp Ala Met Gly Met Asn Met Ile Ser Lys Gly Val Glu
          915   920   925

His Ala Leu Asn Val Met Ala Thr Glu Ala Gly Phe Ser Asp Met Asn
      930   935   940

Ile Ile Thr Leu Ser Gly Asn Tyr Cys Thr Asp Lys Lys Pro Ser Ala
945   950   955   960

Leu Asn Trp Ile Asp Gly Arg Gly Lys Gly Ile Val Ala Glu Ala Ile
              965   970   975

Ile Pro Ala Asn Val Val Arg Asp Val Leu Lys Ser Asp Val Asp Ser
              980   985   990

Met Val Gln Leu Asn Ile Ser Lys Asn Leu Ile Gly Ser Ala Met Ala
          995   1000   1005

Gly Ser Val Gly Gly Phe Asn Ala Gln Ala Ala Asn Leu Ala Ala
      1010   1015   1020

Ala Ile Phe Ile Ala Thr Gly Gln Asp Pro Ala Gln Val Val Glu

1025   1030   1035

Ser Ala Asn Cys Ile Thr Leu Met Asn Asn Leu Arg Gly Ser Leu
    1040   1045   1050

Gln Ile Ser Val Ser Met Pro Ser Ile Glu Val Gly Thr Leu Gly
    1055   1060   1065

Gly Gly Thr Ile Leu Glu Pro Gln Gly Ala Met Leu Asp Met Leu
    1070   1075   1080

Gly Val Arg Gly Ser His Pro Thr Thr Pro Gly Glu Asn Ala Arg
    1085   1090   1095

Gln Leu Ala Arg Ile Ile Gly Ser Ala Val Leu Ala Gly Glu Leu
    1100   1105   1110

Ser Leu Cys Ala Ala Leu Ala Ala Gly His Leu Val Lys Ala His
    1115   1120   1125

Met Ala His Asn Arg Ser Ala Pro Ala Ser Ser Ala Pro Ser Arg
    1130   1135   1140

Ser Val Ser Pro Ser Gly Gly Thr Arg Thr Val Pro Val Pro Asn
    1145   1150   1155

Asn Ala Leu Arg Pro Ser Ala Ala Ala Thr Asp Arg Ala Arg Arg

<210> 51
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 51
gcaagctctg ctaccagcac   20

<210> 52
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 52
ctaggccaac ttcagagccg   20

<210> 53
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 53
agtcatgcag gatctgggtc   20

<210> 54
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 54

gcagacacat cggtgaagtc   20

<210>   55
<211>   20
<212>   DNA
<213>   Penicillium citrinum

<400>   55
aaaccgcacc tgtctattcc   20

<210>   56
<211>   20
<212>   DNA
<213>   Penicillium citrinum

<400>   56
ctttgtggtt ggatgcatac   20

<210>   57
<211>   20
<212>   DNA
<213>   Penicillium citrinum

<400>   57
cgctctatca tttcgaggac   20

<210>   58
<211>   20
<212>   DNA
<213>   Penicillium citrinum

<400>   58

tcaatagacg gcatggagac   20

<210> 59
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 59
atgtcagaac ctctacccccc   20

<210> 60
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 60
tcaagcatca gtctcaggca   20

<210> 61
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 61
atgtccctgc cgcatgcaac   20

<210> 62
<211> 20
<212> DNA
<213> Penicillium citrinum

<400> 62

ctaagcaata ttgtgtttct   20

end C_1